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BLOOD GROUP FREQUENCIES IN ADMIRALTY ISLANDERS: FURTHER OBSERVATIONS ON THE FIJIANS AND INDONESIANS AND ON Rh GENE FREQUENCIES IN SOME OTHER RACES.

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EXTENDING further our surveys of blood group frequencies of races in the south-west Pacific, we have been fortunate in obtaining blood samples from representatives of the Admiralty Islanders. The samples were collected on Manus Island (about 633 square miles), which is the largest of the Admiralty group, lying between New Ireland and the northern shoulder of the New Guinea mainland. Formerly a German colony, situated about 2° south of the equator, Manus Island (Great Admiralty Island) was mandated to Australia by the League of Nations in 1919. Little was heard of it until its magnificent harbour made it of strategic importance in World War II. It was, however, discovered by Schouten and Lemaire as early as 1616.

The Melanesian people of these islands may be roughly classified into three groups: (i) the inland people are known as Usiai; (ii) the light-skinned, timid, scrawny natives of the lesser islands, known as the Matankor, have different customs and speak different dialects; (iii) the third group, known as the Manus or "salt water boys", numbering about 2,000, have darker skins and are much more aggressive, and according to Krieger (1943) have been singled out for study by American anthropologists.

The "Encyclopædia Britannica", fourteenth edition, refers to the natives of Manus Island as essentially Papuan with some mixture of blood, and further states that the language used is Papuan in type. No doubt the American anthropologists referred to by Krieger will publish (or have published) the results of their physical surveys on Manus islanders, and their findings may thus be correlated with the blood group findings recorded in this paper. As far as we are aware, no other blood group studies have previously been made in the Admiralty Islands; but a few of the people may have been included in earlier blood surveys conducted in other areas by other investigators. However, these surveys have dealt only with the blood groups O, A, B and AB. As a result of this investigation we are now able to report the blood groups, subgroups, M, N types, the Rh types and the respective gene frequencies in a small sample of the natives on Manus and other nearby islands.

Materials and Methods.

Admiralty Islanders.

The arrangements for collecting the blood samples were made through the courtesy of Lieutenant-Colonel W. A. Hugh Smith, of A.N.G.A.U., Port Moresby, in 1945, and the samples were collected by Lieutenant B. A. Cronk, of the Medical Section, A.N.G.A.U., who was then stationed on Manus Island. Lieutenant Cronk supplied all details about age and island of origin, and he selected the natives to be tested. The subjects were mostly adult males, and family groups were avoided so that the widest possible sampling would be given.

The blood samples, consisting of two drops of blood, were collected into small bottles of glucose-citrate preserving solution (Simmons and Graydon, 1945) and were returned to us packed in ice by the courtesy of the Royal Air Force and the United States Air Force. The samples

were all tested within five days of collection by the slide technique as described by Simmons, Bryce, Graydon and Wilson (1941), by Simmons, Graydon, Jakobowicz and Bryce (1943), and by Simmons, Jakobowicz and Kelsall (1945), for the various groups and for M N and Rh types.

The anti-Rh′ serum used in these tests was a potent one found and generously supplied by Dr. W. W. Hallwright, of Wellington, New Zealand, while the anti-Rh″ and anti-Hr′ serum samples were most kindly sent to us by Dr. A. S. Wiener, of New York. The anti-Hr′ serum was one found by Dr. Peter Vogel, and proved to be of exceptional potency.

Results.

In Table I are shown the results of the blood group and subgroup investigations and M N tests, together with the respective gene frequencies. Of 112 subjects tested from the Admiralty Islands, 42 had been born on Manus Island and 70 on other islands. Of the total, 51·8% were of blood group O, 23·2% were of blood group A_1, 21·4% were of blood group B and 3·6% were of blood group A_1B. This finding gives the following gene frequencies for groups A, B and O respectively: $p = 0{\cdot}146$, $q = 0{\cdot}136$ and $r = 0{\cdot}720$. It will be noted that subgroup A_2 was absent.

In the M N type tests, 14·3% of subjects were found to be of type M, 39·3% were of type MN and 46·4% were of type N. The gene frequencies are: $m = 0{\cdot}339$ and $n = 0{\cdot}661$.

In Table II are shown the findings for the Rh types as determined by the use of anti-Rh°, anti-Rh′, anti-Rh″ and anti-Hr′ testing sera. Of 112 subjects tested, 87·5% were of Rh type Rh°′Rh°′, 5·4% were of type Rh°′rh, 0·9% were of type Rh°″ and 6·2% were of type Rh°′Rh°″.

The percentage of positive reactions found with anti-Rh′ serum was 99·1, and with anti-Hr′ serum 12·5, and when these results were subjected to the statistical tests as described by Graydon and Simmons (1946) it was found that D/σ_D was 0·6, which is satisfactory.

Fijians.

In a previous report (Simmons, Graydon and Barnes, 1945) were presented the results of investigation of the blood groups, subgroups, M N types and Rh factor in 200 Fijians who originated on Viti Levu and other islands in the Colony of Fiji. At that time we were unable to determine the Rh types of these people, as the rare anti-Rh testing sera were not available. We have since been able to determine the Rh types of Fijians through the courtesy of Dr. Godfrey Barnes, of the Laboratory and Research Division, Suva, Fiji, who generously collected a further 110 blood samples, and forwarded them to us by air. We also carried out tests on these samples for the blood groups, subgroups and M N types, so that a total of 310 adult Fijians has now been tested by us. The results of these two surveys are shown together in Table III, with the respective gene frequencies for the groups and M N types. The differences observed in the percentages of groups and M N types in the two surveys are probably the result of sampling from representatives of the many islands involved in both surveys.

In Table IV we present the Rh typing results on the last lot of 110 samples of blood collected. Of these, 70·9% were of type Rh°′Rh°′, 18·2% were of type Rh°′rh, 1·8% were of type Rh°″ and 9·1% were of type Rh°′Rh°″. The percentage of positive reactions found with the anti-Rh′ serum was 98·2, and with the anti-Hr′ serum 29·1, and when the statistical tests were applied to these figures it was found that D/σ_D was 0·4, which is satisfactory.

It should be noted, also, that of 310 Fijian subjects now tested by us for the Rh factor, all have proved to be Rh-positive. In the blood group tests, subgroup A_2 was again absent.

Indonesians.

Simmons, Graydon and Ouwehand (1945) reported the results of investigation of blood groups, subgroups, M N types and the Rh factor in a series of 296 Indonesians who had originated on Java, Celebes, Ambon, Timor and sixteen other islands. In that survey it was not possible to perform tests for the Rh types, which it was our desire to complete as soon as suitable Rh typing serum became available. The tests for Rh types were subsequently performed in 1945 on two series of samples, each consisting of 100 blood samples from adult Indonesians who were then living temporarily in Melbourne. The samples were kindly collected by Dr. C. Lumkeman, of the Netherlands East Indies Medical Department, Melbourne. In Table V we have referred to the later tests in 1945 as Series II and Series III. The subjects in Series II were examined for the Rh types only, anti-Rh°, anti-Rh′ and anti-Rh″ testing sera being used. In Series III tests were performed for the blood groups, subgroups and M N types in addition to those for the Rh types, and on this occasion an anti-Hr′ testing serum was used. Thus, a total of 496 Indonesians have now been tested for the Rh factor, and of these, 494 were Rh-positive (99·6%). Actually, 492 blood samples were positive with an anti-Rh° (85%) testing

TABLE I.

Blood Group and M N Frequencies in Admiralty Islanders.

Island.	Number of Subjects Tested.	Blood Groups.				Gene Frequencies.			D/σ_D.	Blood Types.			Gene Frequencies.		D/σ_D.
		O.	A_1.	B.	A_1B.	p.	q.	r.		M.	M N.	N.	m.	n.	
Manus ..	42	17	12	13	0	0·154	0·169	0·636	—	5	13	24	0·274	0·726	—
Other islands	70	41	14	11	4	0·138	0·113	0·766	—	11	31	28	0·379	0·621	—
Totals..	112	58 (51·8%)	26 (23·2%)	24 (21·4%)	4 (3·6%)	0·146	0·136	0·720	1·2	16 (14·3%)	44 (39·3%)	52 (46·4%)	0·339	0·661	1·2

TABLE II.

The Rh Blood Types in Admiralty Islanders.

Island.	Number of Subjects Tested.	Rh Types and their Reactions with Antisera Rh°, Rh′, Rh″ and Hr′.				Percentage of Positive Reactions with Antisera.		D.	σ_D.	D/σ_D.[1]
		Rh°′Rh°′. ++−−	Rh°′rh. ++−+	Rh°″. +−++	Rh°′Rh°″. ++++	Anti-Rh′.	Anti-Hr′.			
Manus and other islands	112	98 (87·5%)	6 (5·4%)	1 (0·9%)	7 (6·2%)	99·1	12·5	0·03	0·05	0·6

[1] Graydon and Simmons (1946)

TABLE III.

Blood Group and M N Frequencies in Fijians: Comparison between Present Survey and Earlier Survey. (Viti Levu and Other Islands.)

Author.	Number of Subjects Tested.	Blood Groups.				Gene Frequencies.			D/σ_D.	Blood Types.			Gene Frequencies.		D/σ_D.
		O.	A_1.	B.	A_1B.	*p*.	*q*.	*r*.		M.	MN.	N.	*m*.	*n*.	
Present survey.	110	58 (52·7%)	32 (29·1%)	15 (13·6%)	5 (4·5%)	0·186	0·096	0·726	0·7	15 (13·6%)	39 (35·5%)	56 (50·9%)	0·314	0·686	1·7
Simmons *et alii* (1945)	200	87 (43·5%)	68 (34·0%)	33 (16·5%)	12 (6·0%)	0·225	0·120	0·660	0·5	22 (11·0%)	89 (44·5%)	89 (44·5%)	0·332	0·667	0·034

TABLE IV.

The Rh Blood Types in Fijians.[1] *(Viti Levu and Other Islands.)*

Number of Subjects Tested.	Rh Types and their Reactions with Antisera Rh°, Rh′, Rh″ and Hr′.				Percentage of Positive Reactions with Antisera.		D.	σ_D.	D/σ_D.
	Rh°′Rh°″. ++−−	Rh°′rh. ++−+	Rh°″. +−++	Rh°′Rh°″. ++++	Anti-Rh′.	Anti-Hr′.			
110	78 (70·9%)	20 (18·2%)	2 (1·8%)	10 (9·1%)	98·2	29·1	0·02	0·05	0·4

[1] Of a total of 310 now tested for the Rh factor, 100% have been Rh-positive.

serum; one sample was classified as of type Rh′Rh″; one sample in the first survey gave negative results with anti-Rh° serum but positive results with polyvalent anti-Rh°Rh′ serum, and must therefore have been of type Rh′ or Rh′Rh″; while two samples in the first survey, when this polyvalent serum was used as a check serum, were classified as probably Rh-negative. The Rh typing results for Series II and Series III are shown in Table V.

When the percentage of positive reactions found with anti-Rh′ and anti-Hr′ serum (Series III) were subjected to the statistical tests (*loco citato*), it was found that D/σ_D was 0·4, which is satisfactory.

A total of 396 blood samples have now been tested for groups, subgroups and M N types, and the results found in the separate surveys do not differ significantly, although the sampling has been obtained from the representatives of many islands in Indonesia. Slightly less than half of the subjects tested originated on Java, and the others originated on more than twenty islands in all. It will be noticed also that all the subjects of blood group A and blood group AB have proved to be of subgroup A_1 and A_1B; this is in accord with our findings for the various native races to date.

The Rh Gene Frequencies.

In the following section we present our attempts to determine the possible Rh gene frequencies in Admiralty Islanders, Fijians, Indonesians, Filipinos, Papuans, Australian white subjects and Hollanders; all of these have been tested by us and the results have been reported in this and earlier papers.

We are now awaiting further blood samples from Australian aborigines and Maoris for the determination of the Rh types, and hope soon to obtain blood samples for testing from the natives of Bougainville and Malaita in the Solomons, from the Dyaks of Borneo, and from New Caledonia.

We would appeal to anyone interested in the native peoples and in this work, who can make contact with the pure Negrito peoples, or to anyone who has contact with native races not mentioned above, to communicate with us so that we can arrange, if possible, for blood samples to be sent by air to Melbourne in order that we may continue these worthwhile studies. We should like, also, to extend our surveys to the interesting peoples of Micronesia. In these days of fast air services we have proved that blood samples collected on distant islands can be most efficiently tested in a central laboratory, where all facilities and testing antisera are available, rather than under the difficult conditions so many investigators have encountered in the field. In this way we shall eventually build up a general picture of the blood group frequencies in our area of the world which contains so many diverse and interesting populations.

In this section we have endeavoured to assess the probable gene frequencies for the various races tested by us for the Rh blood types. It should be noted that our figures are very small, and the gene frequencies may be altered considerably when further and more extensive series have been tested. It should be noted also that in fitting gene figures to the Rh typing results obtained, one has a fair amount of freedom, and thus in some instances it becomes a matter of judgement or personal choice so that the figures chosen will give the best fit statistically.

Admiralty Islanders.

In Table II we have shown the Rh types to be as follows: Rh°′ = 92·9% (Rh°′Rh°′ = 87·5%; Rh°′rh = 5·4%); Rh°″ = 0·9%; Rh°′Rh°″ = 6·2%. The Rh gene frequencies are as follows: $R^{\circ\prime}$ = 0·94; R° (or *r*) = 0·03; $R^{\circ\prime\prime}$ (or R'') = 0·03.

There is no internal indication in the figures to suggest that R° is to be preferred to *r* or that $R^{\circ\prime\prime}$ is more likely than R'', except that the combination *r* = 0·03 with R'' = 0·03 would not explain the Rh°″ (+−++) result. Thus we can probably rule out the R'' gene; but either R° or *r* or both may be present in addition to $R^{\circ\prime\prime}$.

Fijians.

In Table IV we have shown the Rh types to be as follows: Rh°′ = 89·1% (Rh°′Rh°′ = 70·9%; Rh°′rh = 18·2%); Rh°″ = 1·8%; Rh°′Rh°″ = 9·1%. The Rh gene frequencies are as follows: $R^{\circ\prime}$ = 0·84; R° = 0·11 or *r* = 0·11 or $R^{\circ} + r$ = 0·11; $R^{\circ\prime\prime}$ = 0·05 or R'' = 0·05 or $R^{\circ\prime\prime} + R''$ = 0·05. The combination R'' = 0·05 with *r* = 0·11 is again unlikely, as it would not account for the "+−++" grouping.

Indonesians.

In Table V we have shown the Rh types to be as follows: Series II: Rh°′ = 75%; Rh°″ = 2·0%; Rh°′ Rh°″ = 22·0%; Rh′Rh″ = 1·0%. Series III: Rh°′ = 73% (Rh°′Rh°′ = 64·0%; Rh°′rh = 9·0%); Rh°″ = 3·0%; Rh°′Rh°″ = 20·0%; Rh°′Rh$_z$ = 3·0%; Rh° = 1·0%. The Rh gene frequencies are as follows. The first column gives the frequencies calculated by us, and in the second column are given

TABLE V.

The Rh Blood Types in 200 Indonesians.[1] *(Series II and III.)*

A. Series II. (May, 1945.)						B. Series III. (September, 1945.)								
Island.	Number of Subjects Tested.	Rh Types and their Reactions with Antisera Rh°, Rh′ and Rh″.				Island.	Number of Subjects Tested.	Blood Groups.				Blood Types.		
		Rh°′. ++−	Rh°″. +−+	Rh°′Rh°″. +++	Rh′Rh″. −++			O.	A_1.	B.	A_1B.	M.	M N.	N.
Java and 18 other islands.	50 / 50 } 100	75·0%	2·0%	22·0%	1·0%	Java and other islands.	50 / 50 } 100	44·0%	24·0%	27·0%	5·0%	24·0%	49·0%	27·0%

C. Series III.

Island.	Number of Subjects Tested.	Rh Types and Their Reactions with Antisera Rh°, Rh′, Rh″ and Hr′.						Percentage of Positive Reactions with Antisera.		D.	σ_D.	D/σ_D.
		Rh°′Rh°′. ++−−	Rh°′rh. ++−+	Rh°″. +−++	Rh°′Rh°″. ++++	Rh°′Rh_2. +++−	Rh°. +−−+	Anti-Rh′.	Anti-Hr′.			
Java and other islands ..	100	64·0%	9·0%	3·0%	20·0%	3·0%	1·0%	96	33	0·02	0·05	0·4

[1] The first series of 296 Indonesians tested for blood groups, M N types and the Rh factor was reported by Simmons, Graydon and Ouwehand (1945). The second series of 100 Indonesians was tested in May, 1945, for the Rh types, but no anti-Hr′ serum was then available. The third series of 100 Indonesians was tested in September, 1945, for the Rh types, and on this occasion anti-Hr′ serum was available. In all, 396 have been tested for blood groups, subgroups and M N types; 496 have been tested for the Rh factor, and of these 494 were Rh-positive (99·6%); 200 as shown above have been tested for the Rh types.

frequencies suggested by Dr. R. R. Race (1945; personal communication):

$R^{\circ\prime}$ = 0·80	$R^{\circ\prime}$ = 0·80
R° = 0·06	R° = 0·08
$R^{\circ\prime\prime}$ = 0·13	$R^{\circ\prime\prime}$ = 0·04
R^{z} = 0·02	R^{z} = 0·02
	r = 0·06[1]

Neither set of figures gives a good fit, and it seems difficult to get a better solution.

The same findings for the 200 Rh types in Indonesians were made available to Dr. A. S. Wiener, and in a personal communication (1945) he made the following statement:

> Of course, the Rh′Rh″ blood is merely a rare freak, so I did not include it in the calculations. Otherwise, your data fit perfectly with the genetic expectations. Your percentage of Hr negatives (33%) compares well with the calculated percentage (31·5%). The sum of the gene frequencies closely approximates 100%, with the gene Rh_2 having a frequency of 1·8%; U (Rh_1 + Rh′) = 82·7%; V = 11·0% and W = 7·0%.

Filipinos.

The Rh types found in 100 Filipinos were reported by Simmons and Graydon (1945) as follows: Rh°′ = 87%; Rh°″ = 2·0%; Rh°′Rh°″ = 11·0%. The Rh gene frequencies are as follows:

$R^{\circ\prime}$ = 0·88	or $R^{\circ\prime}$ = 0·86
$R^{\circ\prime\prime}$ = 0·06	$R^{\circ\prime\prime}$ = 0·08
R° or r = 0·05	r = 0·06

The minimum number of genes shown to exist is two—namely, $R^{\circ\prime}$, $R^{\circ\prime\prime}$, with frequencies 0·933 and 0·059 respectively. However, they do not make a good fit, so we must assume at least one additional gene to be present. It may be any one of R°, R' and r, and there is no real preference. R° has been found in Indonesians; r has been found in whites who have been mixing with the Filipinos for many centuries; both R° and r may have been found in the Admiralty Islanders and in Fijians.

Papuans.

The Rh types found in 100 Papuans were reported by Simmons, Graydon and Woods (1946) as follows: Rh°′ = 93% (Rh°′Rh°′ = 89%, Rh°′rh = 4%); Rh°′Rh°″ = 4%; Rh°′Rh_2 = 3%. The Rh gene frequencies are as follows: $R^{\circ\prime}$ = 0·943; R° = 0·021; $R^{\circ\prime\prime}$ = 0·02; R^{z} or R^{y} = 0·016.

[1] Calculated from the 496 total tested. See text.

The gene frequencies obtained by calculation thus give an excellent statistical fit with the data. The total incidence expected on the basis of these gene frequencies for all the Rh blood types not observed in our tests is less than 0·2%; thus it is not surprising that the phenotypes Rh°″ and Rh° were absent.

It is worthy of note that the percentage of blood type Rh°′ is the highest yet reported for any race, but is of the same order as that found in Admiralty Islanders, in Fijians and in Filipinos. In Indonesians we found the incidence of type Rh°′ to be 74%; Wiener, Sonn and Yi (1944) found that of type Rh°′ in Chinese to be 60·6%; while in the white races the type Rh°′ percentage is approximately 55.

Australian Whites.

The Rh types found in 350 Australian whites were reported by Simmons, Jakobowicz and Kelsall (1945), and in this series 225 subjects were tested with an anti-Hr′ serum. The Rh types were as follows: Rh°′ = 54% (Rh°′Rh°′ = 23·5%, Rh°′rh = 31·5%); Rh°″ = 12·6%; Rh°′Rh°″ = 16·6%; Rh° = 0·6%; Rh′ = 0·9%; Rh″ = 0·6%; Rh-negative, rh = 14·9%.

The Rh gene frequencies are set out in Table VI.

TABLE VI.

Gene.	Australian Whites (350).	English (927). (Fisher and Race, 1946.)	Americans (645). (Wiener *et alii*, 1946.)
$R^{0\prime}$	0·434	0·436	0·449
r	0·385	0·379	0·359
$R^{0\prime\prime}$	0·134	0·128	0·169
R'	0·011	0·008	0·012
R^{0}	0·007	0·030	0·025
R''	0·007	0·017	0·006
R^{z}	0·020	0·001	—

The figures calculated for the Rh gene frequencies in Australian whites give an excellent fit with the data; they differ from the English figures mainly in respect of the frequencies of the rarer genes. There is strong evidence of the presence of the extra gene R^{z} in preference to the gene R^{y}, owing to the former's having been found in the English series.

Hollanders.

The Rh types found in 130 natural-born Hollanders were reported by Graydon, Simmons and Woods (1946) as follows: $Rh^{\circ\prime}$ = 51·5%; $Rh^{\circ\prime\prime}$ = 12·3%; $Rh^{\circ\prime}Rh^{\circ\prime\prime}$ = 17·7%; Rh° = 1·5%; $Rh^{\prime}$ = 1·5% and rh = 15·4%. The Rh gene frequencies are as follows: $R^{\circ\prime}$ = 0·41; $R^{\circ\prime\prime}$ = 0·16; R° = 0·02; $R^{\prime}$ = 0·02; r = 0·39.

In the foregoing gene frequency calculations the rare genes R^z and R^y have been omitted. If these frequencies are assumed to be in a homogeneous population, the number in each Rh type to be expected according to the genetic theory can be calculated, and the findings can be compared statistically with the actual findings to determine the closeness of the fit of the gene frequencies with the experimental data. In this instance χ^2 = 2·43 for one degree of freedom, giving a value for p of 0·12, which indicates that the calculated gene frequencies fit the data reasonably well (Graydon *et alii*, 1946).

Summary.

1. Blood samples collected from 112 Admiralty Islanders have been tested for the blood groups, subgroups of A, M N types and Rh types. No previous blood survey, as far as we are aware, has been carried out in the Admiralty Islands. Of the 112 blood samples tested, 51·8% belonged to group O, 23·2% to subgroup A_1, 21·4% to group B and 3·6% to subgroup A_1B. Subgroup A_2 was absent. The corresponding blood group gene frequencies are p = 0·146, q = 0·136 and r = 0·720. There were 14·3% of type M, 39·3% of type M N and 46·4% of type N, with the corresponding gene frequencies as follows: m = 0·339 and n = 0·661. Tests for the Rh types showed that 87·5% of the samples belonged to type $Rh^{\circ}Rh^{\circ\prime}$, 5·4% to type $Rh^{\circ\prime}rh$, 0·9% to type $Rh^{\circ\prime\prime}$ and 6·2% to type $Rh^{\circ\prime}Rh^{\circ\prime\prime}$; 100% of those tested were thus Rh-positive.

2. A second blood investigation on 110 Fijians and on 200 Indonesians has been completed, and the results, including those of investigation of the Rh types, are reported.

3. An attempt has been made to assess the probable Rh gene frequencies in Admiralty Islanders, Fijians, Indonesians, Filipinos, Papuans, Australian whites and Hollanders, using material reported by us in this and earlier papers.

4. An appeal is made to those who can make contact with pure Negrito peoples, or with other races in the Pacific not investigated by us, to communicate with us so that these investigations may be extended.

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PSYCHOLOGICAL ASPECTS OF THE EARLY DIAGNOSIS OF CANCER.

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Brisbane.

SOME time ago Dr. A. G. S. Cooper, therapist for the Queensland Radium Institute, suggested that I should examine those persons suffering from cancer who came to the institute too late for curative treatment. He believed that their delay in seeking treatment was due to psychological causes rather than to the nature of the growth.

The results of this survey should provoke discussion on two main questions: Why do patients come too late for treatment? What can be done about it?

Do Cancer Patients Come Late for Treatment?

The answer to this question is unanimously "Yes". There is a constant plea by cancer therapists and by surgeons for cancer to be diagnosed early.

Stebbing, the honorary secretary of the Radium Commission, in a recent paper, "Total War on Cancer", stated: "I do not pretend that we can prevent all deaths from cancer, but I do claim that if all cases were recognized early and treated promptly and efficiently, nearly half—that is to say, some 30,000 people in England and Wales—would be saved from death by this disease each year. I claim, too, that the discoveries that have been made during the last ten years give good grounds for hoping that the hard core of the other half will yield to further well-planned and intensive research."

Brian Swift, in his address as retiring president of the South Australian Branch of the British Medical Association last year, spoke in a similar strain about carcinoma of the cervix: "It is a most depressing position; patient after patient with advanced cancer of the cervix is being admitted to hospital. I feel something ought to be done to try to catch this disease in its early stage, namely, really before symptoms show themselves."

A similar plea is made by surgeons. They will pitifully cite cancer of the stomach, telling us that only one case in ten reaching their hands is operable.

These few statements suggest that a far greater proportion of patients with cancer should be seen at an earlier stage, at a stage more suitable for treatment. Yet we do not find an analysis of the reasons why patients come late. It is uncommon to find surgical or medical articles devoted to the reasons for patients attending too late for treatment of their disease.

But even if we concede that cancer patients could attend earlier, can we be sure that our treatment will be successful? In an "Annotation" from *The Lancet* of June 22, 1946, commenting on the report of the Holt Radium Institute, it was reported that the Health Organisation of the League of Nations examined the reports of 10,970 patients with cancer of the cervix. Of this number, 11% were seen early, yet only 56% were alive and well at the end of five years. Of the patients seen at the Holt Institute, 25% came early and 87% were alive and free five years later.

This problem of the early diagnosis of cancer can be put forward in another way. We are told that many patients with cancer should see a doctor at an earlier stage of their disease than they do now. But can they? If they can present earlier, when they first become aware of their disorder, is it early enough for satisfactory treatment? Are our present methods of treating cancer in the early stages adequate? If not, how can the patient know when

to come for curative treatment? Have we other more suitable diagnostic measures?

These are some of the questions that require an answer based on factual material. My concern is mainly with the first question, "Can patients attend earlier for treatment?"

Why Do Cancer Patients Come Late?

I have based my remarks on fifty patients. Although this number may not be statistically sound, yet I think the conclusions drawn from the number would be unaltered if based on a larger series.

The patients examined were chosen on one criterion: "The person should have come earlier for treatment." I understand that the selection of patients is representative of those attending the Radium Institute. Some criticism may be levelled on this score—that the type of patient attending the Radium Institute is not representative of all cases of cancer. I think there is little substance to this argument because the institute serves the hospital class of this State and to it would be referred not only patients suitable for radium, but also those whose disease was deemed inoperable by the general surgeon.

I should like to stress at the outset that in most cases there is more than one reason, more than one cause, for delay in the patient's seeking treatment. At the same time these causes can be classified into five main groups—social or environmental difficulties, personality defects, ignorance, the nature of tumours and medical mismanagement. The factors operating in each group will be apparent as they are analysed in more detail.

Environmental or Social Difficulties.

Money Difficulties.—In this series four patients said that lack of money prevented their seeking treatment. This was either because they could not afford to travel a long distance for treatment or because they could not leave their family without financial support whilst they were away.

Distance.—In Queensland distance is an important problem. People living in isolated regions will not travel, for medical treatment or other causes, unless there is an urgent need. Such persons remain at their work till their health is considerably impaired. This was the main cause for delay in the case of four patients, but was also significant in eight others.

Family Ties.—In six cases family ties were mentioned: "I could not leave my sick wife." "Because of the war. My daughters were having their babies. A grandson broke his leg. Just a series of upsets which stopped me coming."

Personality Defects.

The mental attribute of consciousness makes us aware of the state of our body and the nature of our environment. It should hardly need stressing that if this quality of awareness is at fault our knowledge of what is happening will be in error. If our awareness is impaired or decreased we shall not realize so quickly or so fully what is happening in our body. If our awareness is distorted we shall put a wrong interpretation on what is happening in our body. I am here concerned with altered awareness due to defects of central origin and not to defects due to peripheral lesions such as blindness or peripheral anæsthesia.

This defect of impaired or distorted awareness may be lifelong or it may be a temporary state present at the time the person is smitten with his sickness. It can be due to one or more of the following personality traits.

The Mentally Subnormal.—In this series I classed 15 persons as having an intelligence on the low side of average. The defect was not gross. Such persons, because of their limited intelligence, cannot appreciate or reason about changes occurring in their bodies until these changes become gross or until an outsider draws his attention to them.

It is possible that the peripheral sensory mechanism in such persons has less neural tissue than in normal persons because there would be a generalized deficiency of nervous tissues.

The Over-Cheerful.—Twenty-one persons could be classified as cheerful, happy-go-lucky or euphoric. In such a frame of mind the tendency is not to worry about things, to minimize them—"I'm not concerned; it's nothing."

Such a mental outlook was enhanced if the person had always been healthy and if his family was healthy. Then nothing could go wrong.

The Apathetic.—I classed five individuals as apathetic, quiet and disinterested. They were not concerned about their lesion. Their cancer was of little moment.

The Nervous, Anxious or Worrier.—Fear and worry are commonly accepted as the most frequent reasons why people delay seeking medical attention for cancer. This cause was suggested as an important one in the annotation referred to previously.

> In some cases this delay may arise because the symptoms seem trivial and are therefore ignored, but often, particularly where the cancer is of an exposed site, it is probably the fear of having their worst suspicions confirmed that holds patients back; not so much the fear of the disease as the fear of being told that they have the disease.

Such persons form only a relatively small group in this series. Of eight persons of the worrying type, in only six instances could fear or worry be regarded as an important factor in delaying the person's attendance at hospital.

The relative smallness of this group is to be expected because most persons with fear or anxiety seek advice for the mildest of symptoms. Such persons form a large group of ordinary psychiatric practice. They develop undue fears or abnormal ideas if given inadequate information or if they come in contact with unsuitable articles on such a subject as cancer.

In some instances the fear of the disease is transferred. Certain women say they did not come because of the fear that their families could not carry on in their absence.

I would question whether fear is a major factor in the delay of cancer sufferers seeking treatment. It is perhaps the reverse: that fear will create much needless invalidity if an ill-conceived propaganda campaign is instituted.

The Elderly, the Senile Group.—As cancer is a disease of the later years of life one would expect the mental associations of age to be present in many such persons.

Nature, in her wisdom, prepares us for death by dampening our state of consciousness as the years go by. There is a lessening of feeling and a dulling of interest in the happenings of the present. The person is contented to live and think in the past. In this way the old person pays little attention to what is happening in himself or about him, especially if these happenings are insidious in onset or undramatic in their nature. So he would not notice the slow changes of cancer.

This indifference is accentuated by other changes of age. Growths are less active and therefore slower. Failing vision and impaired nervous functioning from an impoverished blood supply may make these things less noticeable. These changes are even of less concern if the person has been apathetic, disinterested or cheerful throughout life.

There are other physical defects often present in the person of advanced years. Cancer is merely the most obvious manifestation of the ageing individual. There would then seem little reason to support enthusiastic attempts to stay the merciless processes of decay and dissolution of the human organism.

The number of elderly persons in this series will be referred to later.

The Depressed, Surly Type.—Such persons resent intrusion on their thoughts and any attempt to ascertain their views of their sickness. Only one case occurred here.

Those with Abnormal and Fixed Ideas.—I include here those persons who have an abnormal fixed idea as to the nature of their malady or those whose explanation of their sickness is bizarre in its nature.

An example of the former is the person who insists that his trouble is "only a bit of inflammation round and about" or "only a bruise". I placed five patients in this group.

Mental Clouding from Sickness.—Any illness, including that due to malignant disease, after a time will cause general ill health with mental tiredness and loss of interest. This is uncommon as a primary cause for delay in treatment, but it may accentuate dispositional tendencies.

Conclusions.—These figures show that personality factors are important in this problem. More than one abnormal trait may be present in the one person, causing an inadequate or improper appreciation of his cancer and so delaying his attendance for treatment.

The features associated with limited intelligence, cheerfulness, apathy and age would seem the important ones. They were far more frequent than fear or anxiety, usually accepted as the common ones.

Defects in Knowledge.

In the previous section I discussed how defects in our sense of awareness could mislead us in informing us of the changes in our body. But even if our sense of awareness is normal, its usefulness depends on how well we can understand and appreciate the information it gives us. This understanding and appreciation of the significance of stimuli is our knowledge of these things. And our knowledge of what is happening will determine what we will do.

A person's knowledge is derived from instruction at school, from what he hears and sees at home, at work and at recreational centres, and from what he experiences. This knowledge will increase the more of these experiences he can remember and recall, and the more he can reason about them.

It follows that our knowledge is of all grades. Our knowledge of cancer in its simplest, most elementary form is merely knowing that something is wrong. Additional knowledge is of all grades of complexity, reaching its optimum in the cancer worker. He should appreciate best the processes of this disease.

How such knowledge governs our actions is illustrated in the replies of this series of patients to the questions "What is the matter with you?" "What is cancer? Is it serious?"

To the first question, "What is the matter with you?" the replies could be grouped as follows: (*a*) Seventeen had no idea what was the matter: "I've no idea"; (*b*) seven thought it might have been cancer; (*c*) twenty-six gave some explanation, as a ruptured muscle, enlarged glands, a cyst, an ulcer, a skin sore, skin disease, not a growth, a neglect, pyorrhœa, a lantana stab, a bit of inflammation, sunburn, nerves, a lump, an abscess.

To the other question, "What is cancer? Is it serious?" they replied: (*a*) Sixteen had no idea. (*b*) Eighteen had vague ideas. Typical replies in this group are: "I think it's serious." "It's serious. It would disfigure your face. You people should know." "There's a bleeding type and a slow one, isn't there? I haven't read much about them." "I think it's the worse one can have and that has me worried." (*c*) Three had theoretical knowledge: "Cancer is spreading, a growth with roots. It is serious. I have no idea what it looks like." (The patient had cancer of the throat with gland masses. He had no idea what was wrong with himself and was indifferent.) "A growth. It is very serious if not caught in time. It is generally caused by a bump." (*d*) Five had a reasonable knowledge. (*e*) Eight were not asked.

These replies show that ignorance of cancer and of the nature of their sickness was widespread in this series. Yet in all cases there were present gross cancers.

The reasons for this lack of understanding can be briefly summarized:

Personality Defects.—The person is unable, unwilling or does not show any interest in this subject.

School Education.—Little is taught, and if it is, it is only theoretical or it is forgotten by the time one reaches that time of life when knowledge on this subject matters.

Post-School or Adult Education.—Lectures, radio, pictures, papers. I shall return to the importance of these subjects later.

Personal Experience and the Home Environment.—A person learns most from what he himself experiences. He also learns a lot from what those closely associated with him experience and tell him. Our views and attitude are coloured more by our home environment and its close associations than by the instruction of organized education.

Thirty-eight patients said they had always been healthy, had never had anything wrong, or were always fit. One would expect that if such a person got something wrong he would immediately attend to it. Yet our facts disprove this. They show that such a healthy life leads to an attitude: "Nothing can happen to me. It will get better."

In five instances the person had received previous treatment for cancer, yet this lesson did not serve. In some instances it is because of the nature of the person. In others it is because the patient was not given a proper understanding of his malady. He may not want it. He wants treatment without knowing what for.

Personal experience of another sort can cause delay. One patient's friend had died of cancer of the breast despite treatment, so the patient did not think it worth while trying. Again, a patient was examined in a public hospital in front of nurses. She thought she was being made a "laughing stock" so would not seek further treatment. Another patient had an injection for a skin ulcer and as it did no good he did not return for treatment when he developed a skin cancer. These instances emphasize the importance of a proper and adequate examination when a patient first sees a doctor.

A healthy family background was reported in most cases. In five instances malignant disease had occurred in some other member of the family. This background would further heighten the attitude to sickness derived from a healthy life.

In a few cases the patient would not listen to other members of the family who desired the patient to have treatment. The family set-up should more often have the reverse effect.

The immediate circle of friends and workmates can materially influence the patient. Some will gossip harmfully. They will persuade the patient to do this or to try that as the precious time slips by.

These considerations of peculiarities in the individual and his deficiencies in his understanding of cancer show an important cause for delay in his seeking treatment, even before the nature of cancer is considered.

Difficulties due to the Nature of Tumours.

The very nature of cancer must lead to delay in treatment. I should like to dogmatize on some of the reasons for this.

The Nature of Cancer.—It has a close biological relationship with the tissues of the body. The nervous system serves to determine bodily functioning as it receives impulses from the environment and from within the body. It reacts most readily to abnormal stimuli. This means that cancer does not provide an adequate stimulus unless it interferes with normal bodily functions or unless it can be seen or felt. In any case it must be of some size before making its presence apparent.

The Rate of Growth of Cancer.—As these growths are usually slow, adaptation occurs and so the cancer is large before it involves the sensory mechanism. If the growth is rapid, stimulating the sensory mechanism early, dissemination is often widespread, so foiling early recognition of the initial lesion.

The Site of the Growth.—The site should help in determining earliness for treatment. One would expect early attendance if the skin and surface structures were involved. One cannot expect early awareness of deep-seated growths unless they interfere with functioning in their early stages, as in the common bile duct. It is hard to see the logic of the constant pleas for the early diagnosis of carcinoma of the stomach.

In these series of cases the tumour sites were as shown in Table I. In most of these sites one would expect reasonably early attendance.

The Age of Occurrence.—Cancer in the early periods of life reflects the exuberance of youth in its rapidity of growth, its widespread dissemination and its damaging effects. The growths of mature years, somewhat slower, develop in tissues bearing the marks of age and being less reactive in repair. In this series the ages at which patients were seen are shown in Table II.

On first appearance these figures suggest that a too-old-age group has been examined, but the Registrar-General's report for England shows that half the deaths from cancer are among persons under sixty-five years of age. Half these cases are in this group. The age table does, however, emphasize the time of life in which cancer occurs.

TABLE I.

Site.	Number of Male Patients.	Number of Female Patients.
Face	13	7
Tongue	4	—
Lip	2	—
Mouth	1	—
Plate	2	—
Larynx	3	—
Neck	3	—
Back	1	—
Hand	1	—
Rectum	2	—
Lymph glands	1	1
Breast	—	6
Female genitals ..	—	3

I mention this to stress the need for further information of what would be the individual's expectation of life were cancer absent or were treatment effective. I did not set out to assess this, but a cursory observation of the physical state of the patients examined would suggest that many would have developed other disease had the cancer not occurred. Just because patients die of cancer it cannot be assumed that they would have had years of health had the disease not occurred. Not infrequently the cancer is merely the obvious way in which an organism is terminating its worldly struggle.

The Curability of Cancer.—Is it desirable to recognize cancer early if it cannot be cured? Should the patient be tormented by the understanding of the hopeless nature of

TABLE II.

Age Group. (Years.)	Number of Male Patients.	Number of Female Patients.
20 to 29 ..	1	—
30 to 34 ..	1	—
40 to 44 ..	2	1
45 to 49 ..	3	1
50 to 54 ..	2	2
55 to 59 ..	1	1
60 to 64 ..	6	4
65 to 69 ..	3	5
70 to 74 ..	6	3
75 to 79 ..	6	—
80 to 85 ..	2	—

his condition? Our belief in the might of the scalpel or the power of X rays not infrequently outweighs our understanding of the ways of disease processes. Our theorizing is not always tempered with biological reality.

The Time Factor.—In medicine we too often forget the importance of time. With any complaint, how long should the symptoms be manifest before the patient seeks treatment? If he has a stomach upset we can presume, if a growth is present, it is of some size before it causes symptoms. It is not unreasonable for the person to put the symptoms down to overwork, irregular diet or some other cause before coming for treatment. There must be a symptomless period and a period of symptoms before the patient sees his doctor. We may be able to shorten the symptom period, but it is difficult to see how the symptomless interval can be lessened. Yet these are vital to our problem of the early recognition of cancer.

These remarks on the nature of cancer show that we cannot be optimistic about early diagnosis except in surface tumours or where the tumour interferes early with normal functioning. Tumours have a biological nearness to normal tissues and so will not stimulate adequately the sensory mechanisms evolved to inform us of abnormal functioning in the organism.

Management by the Family or Doctor.

This group of eleven patients comprises patients whose delay in seeking treatment was due to dissuasive arguments by the family or to unsatisfactory treatment or diagnosis by the doctor. The delay is often due to an inadequate examination. It may be due to the doctor's working in isolated areas or to his being rushed in work.

Stebbing stressed this point:

> Although cancer is the second commonest cause of death it is not a common disease. That paradox arises from the fact that hitherto most patients who develop cancer have (I think quite unnecessarily) died of it, whereas in most other diseases the majority of sufferers get well. So it comes about that a family doctor sees many cases of tonsillitis, pneumonia, etc., a year, but not many cases of cancer. Dividing the number of cancer deaths evenly among the doctors in general practice means that each would only see about two cases a year.

Conclusions.

This brief examination of the reasons why patients come too late for treatment shows that the person's attitude towards and his understanding of his disability are important.

It is emphasized by the replies of the patients when asked why they did not come earlier for treatment. The following replies were given: "I was too far away", "I had no money", "It didn't worry me", "I thought it would work out", "I thought I had a boil", "I had no pain", "I thought I could fix it", "Medical mismanagement", "Because I was not getting better", "Because I could not sleep", "I kept putting it off", "It only just came", "I was too frightened", "I didn't think it was serious", "I had no faith in treatment", "My family were ill", "Because it was not healing", "Because I wasn't sick", "I could not make up my mind".

These answers reflect the inadequate and improper understanding of their cancer by this group of patients. They had little realization of the seriousness of their disability.

What is Being Done About It?

If we view medicine as a whole, considering all the types of sickness that affect man, it would seem that cancer receives more than its fair share of attention. The money devoted to research and to treatment centres would seem equal to that given to the study of any other type of disease. Yet we are constantly receiving pleas for more adequate assistance.

The pleas for the early recognition are but one, and the quoted instances are but a sample, of the exhortations of those treating this disease. These pleas in themselves help the cause for early recognition by focusing attention on the disease.

Another recent development, the institution of treatment centres, has been helpful in several ways. Not only do they provide more efficient and more effective treatment, but also when people learn of such centres they will tend to seek advice there more readily than with the present medical services.

There have also been attempts at public education. These include talks over the wireless and articles written in papers and magazines. Many of these are set out unattractively and appear at rare intervals. Do they impress the public mind as successfully as the writings, advertisements and talks advocating patent medicines?

In this State, arising out of the Queensland Cancer Trust, an Education Committee on Health has been

formed. Its function is to educate the public on health matters, including cancer. Persons serving on such committees should be fully conversant with this problem. They should not waste money on this important subject by continuing to issue odd pamphlets, to arrange occasional lectures or broadcasts and to provide periodical films.

Summing up the present position, I may say that considerable money is spent on cancer research, frequent attempts are made to get the medical profession to recognize the disease early, cancer treatment centres are being formed and a move to educate the public has been started. Is this enough?

What Can be Done About It?

What is the problem? There is an urgent need to examine a large series of patients to see how many could have come early, how many could have been effectively treated had they come earlier and in how many the cancer was merely one manifestation of a disintegrating organism.

I should think that if such a survey was made, the percentage of patients who should have attended earlier and who could have benefited from present-day methods of treatment is not great.

The answer to this question could be gained in another way: Do all doctors, nurses and dentists, who should have a reasonable knowledge of cancer, come early for treatment? Do they recognize the disease early in others?

If we assume that an improvement can be effected, it now remains to examine factors that could influence persons to report early with cancer. These can be conveniently considered in the groupings used to discuss the causes for delay in treatment.

Environmental Factors.

Provision should be made to allow persons in any situation to attend for treatment. The Queensland Government has made an excellent move in this direction by providing free transport from any centre to the Radium Institute. It seems hardly fair that such a service should be confined to cancer.

Recent Federal legislation of a social nature has been helpful in providing sickness benefits. This is a move to give a person some financial help during his period of unemployment. Such a provision is necessary, but it should be adequate.

These measures offer some inducement for a person to attend for treatment if delay is due to social difficulties.

Problems in the Nature of the Individual.

This survey suggested that defects in the individual can be an important reason for delay in seeking treatment. Such defects in the appreciation of what is happening in the body are heightened if these bodily changes occur slowly.

If we want to make people aware of what is happening so that they will attend early we have to discuss three questions: "How many want to know about cancer?" "How many can understand what they are told?" "How many people should be told about cancer?"

The first question is not easily answered, but it is doubtful whether the majority of people are interested in cancer unless there is an immediate possibility of its concerning themselves. It is doubtful whether a leading cancer specialist talking on cancer would attract as large a lay audience as a film star talking on nothing. I should think that the majority of persons would be unwilling to learn about cancer unless they were forced to do it. Their attitude on this or any disease is one of apathy rather than of enthusiasm, save at times of crisis.

But should we concede the point that the majority of persons are willing to learn about cancer, how many would understand what they are told? Even we, as medical students, after hearing many lectures and seeing many pathological specimens, found cancer a different proposition when seeing patients. This point emphasizes that even with the best intellects understanding is not easy. It is less easy for the rest of the population and especially for that portion of the population with abnormal personality traits—defective intelligence, apathy, over-cheerfulness, anxiety, old age *et cetera*. They would be unable to grasp what they were told. I should think this group would comprise 20% of the population and this means that any educative measures will be wasted on them.

There is our final question—what persons should be told about cancer? The effect of talk, by worry, can lead to fear. Those that want to know about cancer can find literature on it. For most people, unless they can have a full understanding of this subject, an attempt to give information on cancer can be useless and even dangerous because of the misconstrued notions formed about the disease. This is apparent from the replies given on the nature of cancer. I have also stressed how hard it is to give medical students a full understanding of cancer when the need to know this is essential and where, many and impressive, methods of presenting the subject are at hand.

My own belief is that the majority of people are not keen to learn about cancer. Also there is a considerable percentage of the population who could not grasp what they were taught. And there is another group in whom such knowledge would produce needless fears and anxiety.

Problems in Education.

If, despite my feelings of pessimism, it is thought desirable to give the populace some understanding of cancer there remains to consider this educational campaign under three headings: when to tell, what to tell and how to tell.

When to Tell.—First, in regard to school education, the school would hardly seem the place in which to give detailed instruction on cancer. However, a raising of the general standard of education serves our purpose indirectly if it emphasizes a raising of the general standard of knowledge or understanding. It would also seem desirable for the general principles of health to be given more fully in the later years of school life.

Secondly, in regard to adult education, organized classes can reach only a very limited section of the population if they are conducted on a voluntary basis, as at present. Although the group would gain knowledge, it is doubtful whether the additional knowledge so acquired would influence an earlier attendance of such a selected group. The person whom one wants to attend earlier would not bother with such classes. There remain indirect methods of adult education through propaganda methods and family associations. These will be considered later. As cancer is a disease of the later years of life it is this group that needs educating. Yet it is a group fixed in its habits and often fixed in the secluded atmosphere of the home. In any case, if we concede the need for education it should be given in adult years.

What to Tell.—I should think that few people would be able to understand a description of cancer, even when given in simple form. And the subject is too complex to be given in simple form. There is also another aspect. Why should the people know about cancer only? There are many other diseases which concern them. And they have to burden their minds with other important subjects—work, recreation and so forth.

I would suggest that education, if we must have it, should harp on a simple maxim: "If you are sick or notice anything unusual about yourself for three weeks, see a doctor." This would serve the cause of cancer and the cause of any other disease. With this maxim prominently heading every article on health, information on various diseases could form the substance of the article.

The need for this arises because of the nature of human beings. They are all suggestible in varying degrees. Even the doctor uses remedies little proven in value. This means that the majority of people are swayed more by suggestion than by logical argument. They will understand and absorb short statements, if presented dramatically and if presented often.

How to Tell It.—If we adopted some simple slogan it could be presented at all the stages of life. It would make

people health-conscious, without giving them fears or engendering false concepts of disease. Such a slogan could be presented to the public in talks, in discussions and by our propaganda methods.

It is surprising how little attention has been directed to the importance of radio, the Press and the cinema in modern life. Their social aspects are important and I wish to deal with them, as they relate to the medical profession, in more detail elsewhere. I should here like to make a few comments relevant to the present subject.

I should like to give my meaning of propaganda. It covers the methods employed for the rapid dissemination of knowledge, true or false. Usually propaganda is looked on as something harmful because of its customary use to give false information. But it can serve to give true facts. If facts are given, briefly, impressively and frequently, they will be accepted by suggestible man.

Use of the Press is the oldest method. Most authorities believe that 90% of the people read the papers. Papers had a great influence in moulding public opinion. Their recent tendency to cater for sport, comic strips and sensationalism instead of offering a constant policy is lessening their influence in the community. They could serve health education if a full page was presented dramatically each week. The film has been used mainly for recreation. It could be used for educational purposes because information given in this fashion can be shown dramatically. It impresses both our visual and auditory mechanisms. The radio combines the functions of the Press and film, with emphasis on recreational aspects. Its advantages are that it can bring its message rapidly to many people scattered over wide areas and that it can repeat its message frequently. Less organized methods of propaganda are gossip and discussion within the family circle.

These are the methods of propaganda. I should like now to detail how they entered the lives of the present series of patients.

In the first column of Table III, "Never", "Very occasionally", "Never health", "All without understanding", "Normal", and "Not recorded" are abbreviations for whether the person never reads, listens to the wireless or goes to the pictures; very occasionally does these things; uses them but never reads, listens to or sees pictures dealing with health; uses these propaganda vehicles without really appreciating the nature of the subject matter; uses the propaganda vehicles normally; and was not asked.

TABLE III

Observation.	Number of Persons.		
	Reads.	Wireless.	Cinema.
Never	7	4	33
Very occasionally	8	7	13
Never health	13	24	—
All without understanding	3	5	—
Normally	18	9	4
Not recorded	1	1	—

The replies show that in this group of persons, whom one wants to attend early, these means of bringing their attention to the subject of cancer would be of little avail. They emphasize the futility of a campaign in the Press, radio or cinema unless we can be sure that it reaches the persons to whom it is directed.

It is also of some interest to report certain of the individual replies to these questions.

In regard to the wireless, the following are some of the replies: "I don't listen to the wireless because I can't catch it properly." "I listen to talks." What talks? "Dad and Dave", "Dr. Mac". "I listen to anything." Do you listen to health talks? "I listen to health, but I can't remember what." "I listen." What to? "Horse racing. I don't take any notice of talks because they are only 'chiacking' one another." What do you listen to? "Mostly music. Sometimes talks." Do you ever listen to health talks? "I never get near anything like that." Do you listen to the wireless? "I've no interest. It's too rowdy."

In regard to newspapers and reading, some of the replies were: "I read a fair bit, but I'm more a racing man." "I had a doctor's book, but I couldn't understand it." "I've studied health all my life." "I read everything." "I thought I had a cyst or something." "I didn't think it was serious because there was no pain." "I read the paper." "I don't get much time." "I occasionally read health." "Every one seems the same and I said: Oh, 'blow it'! I'd rather read the horse racing."

In regard to the cinema, some of the replies were: "I only went once." "They don't appeal to me." "I can't follow them." "They're too complicated." "I used to go a lot when I was young."

As well as influencing the individual, these vehicles influence members of the family circle or friends who could help influence a relative or friend suspected of having cancer.

As medical matters are now presented in these vehicles their value is not great. Not only are these subjects presented irregularly, but they are presented only if they are sensational in nature or have some other aspect of popular appeal. Of the patients seen in this series I am doubtful whether, even with a reasonable campaign, more than two would have benefited from it.

It is also necessary to remember that the importance of these vehicles varies from time to time. It is possible that the film will be of more value in the future. It is likely that television may also alter our present conceptions on this subject.

The value of these vehicles in a campaign on any subject, be it cancer or any other sickness, will depend on how much space or time is devoted to the subject. There can be little doubt if much space and time were devoted to any such subject for several weeks, a great impression could be made on the public mind. But the need is for a persistent or prolonged campaign.

Of these vehicles the daily paper could be of most value if a page each day or week was given to a properly prepared advertisement. Perhaps this is being too optimistic. An alternative measure would be for a simple pamphlet to be prepared each month and distributed through doctors' surgeries. It would allow the profession to decide what to tell the public and it would reach a large section of the population.

It has also been held that the doctors can educate the public during the time of their professional relationship. It is hard for me to see how many doctors would have time to do this in the rush of everyday practice.

Conclusions.—On the question of education before any campaign on a specific disease is entertained, I believe that most benefit would occur from a campaign based on a simple statement: "If you are sick for three weeks, see a doctor." Such a statement would reach the public most widely if advertised in the Press or by a special pamphlet distributed through doctors' surgeries. It would have to be presented frequently and attractively.

The Nature of Cancer.

I have already emphasized that the nature of cancer, with its close biological affinity to normal tissues and with its relatively slow rate of growth, does not provide a strong stimulus for our sensory mechanism. So we remain unaware of it till it is of considerable dimensions. This applies particularly to deep-seated tumours. Our sense of touch and our eyes should make us aware of surface tumours at an early stage.

One can expect a person to recognize he has cancer only when he has some abnormal symptom or sees something abnormal, but consideration shows that even if the person is seen at this stage the growth may be advanced. It means that even if the person attends when he first experiences symptoms, this may not be early enough. Brian Swift said that when a campaign was instituted for early cancer diagnosis, emphasizing bleeding as an early symptom, patients with carcinoma of the cervix who attended when bleeding first occurred were found to be beyond

curative treatment. It is also reasonable to expect persons to be less prompt for treatment if their symptoms are less dramatic than hæmorrhage. A person with vague abdominal symptoms, because of the frequency of such symptoms and because of what is written of their nature in patent medicine advertising, would not attend for weeks. And this is reasonable.

If, then, we rely on early symptoms, this will not be sufficient. But are there any other methods of recognizing cancer early?

It has been suggested that regular examinations, say every six months, are an alternative. Yet how thorough is such an examination to be if all bodily systems are overhauled? How practicable is it with the scattered population of this country? It is also questionable whether the people would agree to it and whether the results would justify the expense. When we see the unwillingness of governments to make inoculation against diphtheria, a proven measure, compulsory it is unlikely that they would institute compulsory examinations for cancer, and such examinations would have to be compulsory to ensure that those who wanted help most were examined.

Education of Doctors.

In eleven instances treatment was delayed because of unsatisfactory medical treatment. Of these eleven patients, nine were aged less than sixty-five years—in the group about which one is anxious for satisfactory treatment. In one instance the patient thought he had cancer, but the doctor would not entertain his pleas.

There would seem here room for improvement and it should be possible to do something about it. This point also emphasizes that even with adequate knowledge the nature of the disease is not always appreciated.

In addition to our medical journals, cancer clinics should send literature to doctors each month, attractively presenting the problem of misdiagnosed cases. Such errors rather than our successes should stimulate our hopes for preventing the crippling effects from late recognition of the disease.

Other Measures.

Other ways of approaching this problem have been suggested, but they are slight in effect compared with the main methods already outlined.

In America the American Cancer Society has a series of cured cancer clubs, where patients speak of their experiences, especially if their experience has been cure of their disease. The organization of such societies and the good they do have yet to be assessed.

Summary.

The examination of this group of patients suggests that the reasons for delay in seeking early treatment for cancer can be due to the nature of the individual and to environmental difficulties as well as to peculiarities of the cancer itself.

The defects were perhaps gross in this series, but I feel sure that similar defects to a lesser degree would be present in others. A larger series of patients would have to be examined to ascertain the significance of the different types of defects and to ascertain the number of patients in whom the disease was curable when the patient was first aware of his cancer.

These observations would also suggest that a campaign aimed at the early recognition of cancer would be of little benefit unless properly systematized. It is suggested that it would be more profitable if a campaign was instituted to deal with sickness in general—to attempt to impress on all persons to seek medical treatment if they had any sickness which had been present for three weeks.

And as I have watched these patients with cancer pass through my psychiatric clinic I have thought how fortunate are they in the facilities available to them for treatment when compared with the facilities provided for patients with psychiatric disorders—disorders largely of social origin.

What help is available for the woman whose symptoms are due to the constant strain of caring for her family? What help is available for the man whose symptoms are due to the constant strain of getting employment because of physical or mental defects? These are but two instances of our inability to cope with sickness due to an insufficiency of life's requisites—work, food and recreation.

Do we, as doctors, attempt to cope with this problem? Do we adequately advocate the provision of holiday camps, the institution of work centres for the handicapped person and a standard of living based on the essentials for health? Are we not too enraptured with the power of our dramatic therapeutic measures, the pill or the potion, the scalpel or the therapy machine?

THE CARBONIC ANHYDRASE CONTENT OF THE BLOOD OF ONE HUNDRED NORMAL AUSTRALIAN SUBJECTS.

By W. J. LAWRENCE,

From the Department of Physiology, University of Sydney.

SOME years ago the frequency distribution of the amount of carbonic anhydrase in the blood of one hundred normal Australian subjects was determined.

The method used was that described by Meldrum and Roughton (1933).

The results obtained are set out in ascending order of magnitude in Table I. The first column includes all the males examined, their ages ranging from ten to sixty-seven years. The third column comprises all the females examined, their ages ranging from twenty to twenty-five years. From the group of males, those aged from twenty to twenty-five years have been selected, and the results in this group are given in the second column.

The significance of the difference between the means of the male and female groups, aged from twenty to twenty-five years, was then examined by the application of "Student's" t test; t_{70} proved to be equal to 4·26. This indicated the probability of this difference occurring by chance as only once in about 10,000 times.

Thus it appears that women aged from twenty to twenty-five years have a lower carbonic anhydrase content in their blood than is present in males of the same age group.

On examination of the male list, it was noticed that the subjects aged below eighteen years were concentrated at the lower end, the first, second, third, fifth and twelfth places in the male group being occupied by the five subjects aged under eighteen years. I therefore examined a further ten male subjects, aged less than eighteen years, so obtaining results for 15 subjects. The concentration of carbonic anhydrase in the blood of these 15 youths, in E units per cubic millimetre, was as follows: 1·12, 1·23, 1·35, 1·55, 1·59, 1·66, two at 1·71, 1·74, 1·78, 1·82, 1·92, 2·12, 2·17, 2·31; the mean was 1·719 and the standard deviation 0·322.

When the mean in this group of males was compared with the mean in the male group aged twenty to twenty-five years, "Student's" t test gave a result for t_{50} of 5·15; this indicated the probability of this difference occurring by chance as only once in more than 10,000 times.

Meldrum and Roughton (1934) state that in the blood of the young fœtal goat there is very little carbonic anhydrase. Stevenson (1943) states that in the premature infant the blood carbonic anhydrase content is one-quarter of that in the adult, whilst in the newly born infant it is one-half of the adult value.

From the present results it would appear certain that the blood of the youth aged seventeen years has not yet attained the adult concentration of carbonic anhydrase. The fact that the higher values in this group were obtained from physically mature youths suggests a further line of investigation.

It was also noticed, on examination of the male list, that our oldest subject (aged sixty-seven years) had the highest concentration of enzyme but two; therefore the

males aged more than twenty-five years were selected. The concentration of carbonic anhydrase in the blood of these 20 males, recorded as *E* units per cubic millimetre of blood, was as follows: 1·57, 1·59, 1·66, 1·68, 1·76, 1·77, 1·84, 1·86, 1·87, 1·90, 2·14, 2·16, 2·17, two at 2·18, 2·25, 2·32, 2·34, 2·52, 2·60; the mean was 2·018 and the standard deviation 0·300.

The mean in the group of males aged over twenty-five years was thus less than that in the group of males aged from twenty to twenty-five years. When "Student's" *t* test was applied to the means of these groups, t_{50} was 2·34; this indicated that such a difference might be due to sampling once in every 50 times. This may be suggestive;

TABLE I.

The Carbonic Anhydrase Content of the Blood of Normal Australian Subjects, Reported as E Units (Meldrum and Roughton) per Cubic Millimetre.

Males, 10 to 67 Years. (58 Subjects.)	Males, Selected, 20 to 25 Years. (35 Subjects.)	Females, 20 to 25 Years. (41 Subjects.)
1·12	1·68	1·56
1·23	1·72	1·60
1·55	1·78	1·64
1·57	1·79	1·71
2 at 1·59	1·86	1·72
1·66	2 at 1·87	1·75
1·68	1·90	1·78
1·69	1·91	1·79
1·72	2·00	2 at 1·81
1·76	2·06	1·82
1·77	2·08	1·84
2 at 1·78	2·13	2 at 1·90
1·79	2·14	3 at 1·91
1·85	2·18	1·92
1·86	2·21	3 at 1·93
2 at 1·87	2·23	3 at 1·96
2 at 1·90	2·28	2 at 1·97
1·91	2·30	3 at 2·00
2·00	2·32	2·09
2·06	2·35	2 at 2·12
2·08	2 at 2·36	2·13
2·13	2·38	2·14
2 at 2·14	2 at 2·41	2·17
2·16	2·44	2·18
2·17	2·45	2·20
2 at 2·18	2·48	2·22
2·21	2·51	2·33
2·23	2·52	2·39
2·25	2·53	2·62
2·28	2·58	
2·30	2·60	
2 at 2·32	2·62	
2·34		
2·35		
2 at 2·36		
2·38		
2 at 2·41		
2·44		
2·45		
2·48		
2·51		
2·52		
2·53		
2·57		
2·58		
2·60		
2·62		
2·65		
2·71		
Mean .. 2·101	Mean .. 2·209	Mean .. 1·966
Standard deviation 0·366	Standard deviation 0·275	Standard deviation 0·211

but in any case it would appear that there is no great change in carbonic anhydrase content in the blood after the subject becomes physically adult.

This does not support the findings of Shiskin (1939-1940), who, after examining a total of only 25 subjects, makes the following statement:

> Higher values were observed in the younger subjects. Thus the figures were from 1·18-2·0 E/mm³ with an average of 1·54 E/mm³ in those under twenty, from 0·90-1·51 E/mm³ with an average of 1·29 E/mm³ in the 30-49 age group and from 1·03-1·49 E/mm³ with an average of 1·25 E/mm³ in the subjects over 50.

During the course of this work it became increasingly evident that the results obtained could be used only in a comparative sense. That is, the actual value obtained with one set of apparatus could not be compared with the result when a different set of apparatus was used, or even when a flask of slightly different dimensions was used in the same apparatus. Any comparisons between the results of different workers are thus invalid. For example, in one laboratory here, a subject was repeatedly examined with a result of 1·43 *E* per cubic millimetre; but with our apparatus the result obtained was 1·86 *E* per cubic millimetre.

This, in my opinion, is the reason for the wide variation in the values reported by different workers, shown in Table II.

Van Goor (1937) quotes a few results obtained on human blood by another method. He states that these results were numerically about five times as great as those

TABLE II.

Carbonic Anhydrase Content of Blood of Normal Subjects Reported as E Units per Cubic Millimetre by Different Observers.

Observer.	Number of Subjects.	Range.	Mean.
Roughton	8	0·37 to 0·68	0·55
Hodgson	10	1·39 to 1·75	1·53
Lamble	15	0·93 to 1·5	1·25
Shiskin	25	0·90 to 2·00	1·39
Lawrence	99	1·12 to 2·71	2·10

obtained when Meldrum and Roughton's method was used on the same samples of blood. In his article concentration is given, apparently in error, per cubic centimetre instead of per cubic millimetre.

Some variation was even experienced with fresh batches of reagents whilst the same apparatus was being used. One of these sudden changes was experienced during investigation of the statement by Hodgson (1936) that he found no significant diurnal or day-to-day variation of the carbonic anhydrase content in the blood of a normal person. As it was thought that the accuracy of the method did not allow such deductions to be made, some comparative data on old and new dilutions of blood from the same subject

TABLE III.

Comparison of the Carbonic Anhydrase Activity of Fresh Dilutions of Blood with that of the Same Dilutions after Standing. (E per Cubic Millimetre.)

Date.	Old Dilution.	Fresh Dilution.
3.6.38	—	1·57
6.6.38	1·59	1·55
8.6.38	1·52	1·51
10.6.38	1·54	1·64
14.6.38	1·56	1·57
17.6.38	1·60	—
20.6.38	1·59	1·63
24.6.38	1·60	1·58
29.6.38[1]	1·86	1·83

[1] A fresh supply of phosphate solution had been made up and a new bottle of sodium bicarbonate opened for the determinations on June 29, 1938.

were obtained, since experience had shown that a diluted sample of blood could be stored in the refrigerator for one week without any loss in carbonic anhydrase activity.

Accordingly, on June 3, 1938, a sample of blood was drawn from the subject, and after dilution the activity of the sample was determined and the diluted blood was stored in the refrigerator. After a few days the old dilution was compared for carbonic anhydrase activity with one made from a freshly drawn sample of the same subject's blood. The fresh dilution was then placed in the refrigerator and kept for some days, and the process was repeated. Table III shows the results obtained.

It has never been suggested in the literature that the pH of the phosphate buffer solution should be checked; yet quantities prepared here at different times have varied

from pH 6·72 to 6·79. Subsequent work has shown this difference to be significant; but on the occasion mentioned the pH of the fresh phosphate solution agreed with that of the previous batch to 0·01 unit, as determined by a comparative quinhydrone method. The sudden change was proved to be due in this instance to the new bottle of solid sodium bicarbonate.

Sodium bicarbonate reagent from a number of sources was then examined and found to have a considerable influence on the results obtained.

As the results obtained with the method had been found to be so dependent on various uncontrolled factors, examination of the distribution of the enzyme in various age groups was suspended and the method itself was examined with a view to obtaining more dependable results. The results of this examination will be published later.

Summary.

The carbonic anhydrase content of the blood of 100 normal Australian subjects was examined, a mean value of 2·05 *E* per cubic millimetre being obtained.

The concentration of the enzyme in the blood of youths aged under eighteen years was less than that in the adult; but probably little further change in the enzyme concentration occurred with age.

The blood of women aged from twenty to twenty-five years had a lower enzyme concentration than men of the same age group.

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PENICILLIN IN SOME CHEST CONDITIONS, WITH REPORT OF A CASE OF PNEUMONIA, EMPYEMA AND LUNG ABSCESS IN AN INFANT AGED ONE MONTH.

By W. F. J. CAMMACK,
Lismore, New South Wales.

DURING the past two years I have met with a series of chest cases, traumatic and infective in origin, and have had penicillin available for treatment. Since reports of the use of penicillin in these cases either are few or cover only a small series,[1][2] publication of these notes and comments may be worth while. There is no question that many of these patients owe their rapid recovery, and some their life, to this drug.

Pneumonia, Empyema and Lung Abscess (in an Infant).

Empyema in such a young child as that whose case is reported herewith is exceptionally rare, and in pre-penicillin times was considered to have a 75% fatality rate in children aged under one year. Most textbooks favour drainage by intercostal tube rather than by rib resection in young children. Sheldon (1938) states that it is quicker and attended by less shock; Grey Turner (1940) states that it is "all that is required . . . open thoracotomy is more dangerous in infants than adults due to the greater mobility of the mediastinum"—and this replacing aspiration only after the pus has thickened for several days.

It has been my experience that the local instillation of penicillin into the pleural cavity after aspiration of the pus, in the doses in which we have been accustomed to giving it (for example, 60,000 units per day for adults), has had disappointing results, and neither cures the condition nor eradicates the necessity for adequate surgical drainage. The latter is obviously necessary when thick fibrinous plaques are present and both preclude aspiration by blocking the needle and cause loculation of the pus.

The reason for this apparent failure would seem to lie in inadequate dosage and delayed treatment, apart from the consideration of those cases in which the organism is insensitive to penicillin. Fatti, Florey *et alii*[4] recommend in the treatment of infected pleural effusions the local instillation of 240,000 units of penicillin (or 2,000 units per pound of body weight for patients aged five years) in 20 millilitres of saline solution, repeated on alternate days until the fluid is purulent; then the cavity should be drained and at least 10,000 units in 20 millilitres of saline solution should be instilled twice a day (60,000 units for staphylococci); they also recommend underwater drainage for one hour before each instillation. In the only case of established empyema in which I have used this higher dosage, the response was not much quicker than in previous cases.

This baby, W.N., was presented when aged less than one month old apparently suffering from a feeding upset; he was vomiting his complement (cow's milk) and passing undigested curds. When first examined on September 16, 1946, he did not appear to be perfectly well, though the clinical signs were somewhat indefinite. Inconstant, visible peristalsis was observed in the upper part of the abdomen, and he had a tendency to grunting respiration and the suspicion of transient cyanosis. The first and last of these signs were absent the following day.

On September 18 the infant became acutely and obviously ill, and suddenly collapsed. He was admitted to hospital, where his condition instantly improved. However, the following day crepitations and deficient aeration appeared in the right lung, with pyrexia; he was very ill. On September 19 he was given penicillin by the intramuscular route (15,000 units at once, then 10,000 units every three hours) and sulphadiazine (0·25 gramme at once, then 0·125 gramme every four hours).

Six days later this medication was suspended (perhaps the dose was too small and the course too short), the patient having been clinically well and apyrexial for two days.

J. K. Poppe,[3] dealing with empyema, states that in 53% of his cases a recurrence developed after the cessation of penicillin therapy. It is unwise to suspend either of these drugs too early in any condition. At the same time one has to be wary of sulphonamide fever and of the development of penicillin-resistant strains. One has to try to strike a happy medium.

On September 27 the infant's condition was unsatisfactory. He was having attacks of cyanosis, and diaphragmatic retraction of the lower ribs with respiration was striking. The right pleural cavity was therefore explored with a needle, and two ounces of thickish pneumococcal pus were withdrawn. X-ray examination of the chest revealed a right-sided empyema with mediastinal shift.

The following day, under local anæsthesia, a drainage tube was inserted through the eighth intercostal space in the posterior axillary line, and negative pressure drainage was instituted by means of "Soluvac" bottles, the Wangensteen continuous suction technique being used. Grey Turner (1941) states that negative pressure drainage is unnecessary for a metapneumonic empyema, but it was desirable in this case to prevent the cyanotic turns associated with the mediastinal shift, and it could not be altogether denied that some synpneumonic process had been present as well.

On October 4 X-ray examination revealed pneumonic consolidation of the upper lobe of the right lung, now without empyema. On October 7 the temperature rose again and the baby's clinical condition commenced to deteriorate. Treatment with penicillin intramuscularly and sulphadiazine orally was recommenced and continued for a further twenty-four days. As the intercostal tube was no longer draining and the wound began to "suck", the tube was removed after the instillation of 10,000 units of penicillin into the cavity, and the wound was closed. While the tube was in situ, 10,000 units of penicillin had been instilled through it every second day.

By October 9 the infant was developing a marasmic appearance. A blood transfusion (170 millilitres) was therefore given, with gratifying general improvement that continued. On October 16 exploration of the chest with a needle failed to reveal pus in the pleural cavity. On October 18 there was a sudden, copious discharge of pus through the old wound, resembling recurrent empyema or *empyema necessitans*. However, on October 22, when it was considered safe, the child was radiologically examined again. The result could be interpreted only as the effect of abscess formation in the upper lobe of the lung (formerly consolidated); the contents were thought to have been discharged into the pleural cavity and out through the old wound with partial collapse of that lobe, a small amount of gas being present there. Further aspiration was attempted on October 25, but without result.

The baby's subsequent recovery was without incident, progressive and complete. Throughout the early part of his illness, oxygen was given continuously through a nasal catheter or a face piece. "Colliron" and "Pentavite" were added to his feeds. He was fed with his mother's expressed milk, with pooled human milk, and later with complementary "Vi-Lactogen". Important factors in the child's recovery were faithful nursing attention, blood transfusion, and the two drugs penicillin and sulphadiazine.

Empyema and Gunshot Wounds of the Chest.

During the Tarakan campaign (1945), it was the practice to treat gunshot wounds of the chest with hæmothorax by daily aspiration of the blood and instillation of 60,000 units of penicillin (in addition to the intramuscular administration of penicillin and the oral exhibition of sulphonamides). In the majority of these cases the chest was clean and dry within a few days; but in some empyema developed and was difficult to clear up, even in the chronic stages, as subsequent inquiry found. One young soldier who sustained a gunshot wound of the left lung and diaphragm, survived the radical cure of his diaphragmatic hernia, only to die one month later from empyema and gangrene of the lung, despite continuous and intensive penicillin therapy, both general and local.

With due moderation, Littlejohn[5] states that "penicillin has reduced empyema".

The general approach to chronic empyema from gunshot wounds was dealt with by Horsley.[6] Penicillin is simply a useful adjuvant.

The inadequacy of penicillin to cope with mixed infections and penicillin-resistant strains makes one look hopefully towards the sulphamylon-streptomycin solution described by Howes[7] as being of value in these cases.

Pyonephrosis Causing Empyema Thoracis.

The following case and the final case presented below were both encountered during the Tarakan campaign. In addition to their clinical interest, they demonstrate the differing efficacy of penicillin therapy that Hope Gosse stresses in Fleming's book.[8] In this case it had little if any effect; in the other it worked dramatically. It would seem that penicillin must come into intimate contact with a sensitive organism in the affected tissues, preferably via the blood stream and tissue fluids, to be really successfully used.

A middle-aged Chinese was admitted to hospital with pyonephrosis from long-standing nephrolithiasis. Several days after his admission to hospital he developed acute left-sided empyema when the pyonephrosis eroded into the pleural cavity—not a common occurrence. A rapid nephrostomy was performed as a life-saving procedure, and later rib-resection and open drainage of the pleural cavity were carried out. He was given penicillin both intramuscularly and locally into the empyema cavity. He recovered after a stormy few days at the start, but his recovery was not dramatic, and the local penicillin therapy did not appear to hasten this greatly; it may have contributed towards saving his life, however, as he was very ill at one stage.

Penicillin and Acute Putrid Lung Abscess.

A Japanese soldier, aged twenty-five years, had evaded captivity for several weeks by living in the jungle and subsisting on such things as raw snakes. Somewhat debilitated when admitted to hospital, he displayed acute respiratory symptoms—fever, dyspnœa, wheezing and dry cough. X-ray examination revealed a typical acute putrid abscess of the upper lobe of the left lung, complete with gas and fluid level. Penicillin (50,000 units immediately, then 25,000 units every three hours) was administered intramuscularly, in addition to a sulphonamide by mouth. The abscess vanished completely and dramatically, without expectoration of any sort.

Spontaneous subsidence does occur; it is referred to by Officer Brown[9] and Neuhof,[10] who gives a good account of the surgical treatment at the Mount Sinai Hospital, New York, over a period of sixteen years; but credit must here be given to penicillin for the rapidity of the cure; there had been no response to the sulphonamide alone.

Conclusion.

The main theme of the above notes is the conclusion that all authors on the subject have reached—that is, that the administration of penicillin in empyema and lung abscess must be early, vigorous and prolonged, and both parenteral and local when possible.

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Reports of Cases.

INFARCT-LIKE AREAS IN THE LUNGS IN STAPHYLOCOCCAL PNEUMONIA.

By J. B. CLELAND, M.D., Ch.M.,

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THERE seem to be few if any references to the occurrence of infarct-like areas in the lungs in general accounts of staphylococcal pneumonia. For instance, in a leading article in the *British Medical Journal* of December 18, 1943, at page 783, in which reference is made to a number of papers on this subject, these infarct-like areas are not mentioned. This is partly because in the cases discussed the subjects have survived sufficiently long for actual abscesses to have taken the place of areas of intense congestion or of infarct-like consistency. These infarct-like areas are so common in our cases of staphylococcal pneumonia that they cannot have escaped general recognition. They have probably been considered as ordinary infarcts due to septic thrombosis in branches of the pulmonary artery. It is doubtful, however, whether this is the only explanation. There is no doubt that in the small arteries of the infected areas septic thrombi may be seen, in which are colonies of *Staphylococcus aureus*; but I believe the real explanation of the fact that the alveoli are filled with red cells, as in an infarct, is due to the intense congestion. The staphylococci reach the lung usually by the blood stream, but occasionally by the air passages. As soon as they have lodged and begin to multiply, they cause an intense congestion of all the vessels in their neighbourhood, just as the same organism in the skin causes a tense red boil. It is the intense

turgidity of these capillary vessels, aided probably by cloudy swelling, that seems to be the cause of the escape of the red cells into the alveoli. In the case of an ordinary infarct, due to an embolus in branches of the pulmonary artery, probably a similar mechanism is at work, as the capillaries in the infarcted area will become passively filled and distended by blood flowing into them from adjacent vessels, *vis a tergo* no longer being present owing to the block, so as to move the blood through these congested capillaries. But while in this case the congestion is passive, in the case of staphylococcal pneumonia it would seem to be an active process of distension.

During the pandemic of influenza in New South Wales in 1919, these infarct-like areas were noticed. They were described and illustrated in colour in the report of the Director-General of Public Health, New South Wales, for the year ended December 31, 1919, at page 184, in my account of 130 autopsies on influenza patients. In this report, in describing the "hæmorrhagic and infarct-like areas", I made the following statement:

> In addition to the consolidated areas due to exudate into the alveoli, a pronounced feature in some cases, and a subsidiary one in many, is the presence of extensive hæmorrhagic extravasations in which small or large areas have the alveoli filled with red cells. These hæmorrhages may be infarct-like in appearance, being wedge-shaped, with a broad peripheral base and half to several inches in diameter, or the hæmorrhages may be more diffuse and yet still recognizable as hæmorrhages, or such an area may pass into those of intense congestion. The presence in a definite degree of such areas was noted in 31 out of the 129 cases. In eight cases they were described as definitely infarct-like.
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> There appear to be all grades, from the typical infarct-like portions to those showing intense congestion. The "infarcts" project slightly but clearly, presenting a convex surface which may appear either on the external surface of the lung or between the lobes. In two instances an examination of these areas has revealed on their summits a slight superficial erosion. It has been very interesting to note that in these infarct cases a pure culture of *Staphylococcus aureus* has sometimes been grown. The hæmorrhagic areas naturally give rise to the darker red and purple colours presented on the surface of the lung, while the paler areas, if the case be an early one, except where these represent unaffected lung tissue, may be taken as indicating areas where exudate predominates.

Since then, these infarct-like areas, occasionally with an eroded-looking surface on the summit of the boss, have been met with from time to time. Thus in the course of the last 3,000 post-mortem examinations at the Royal Adelaide Hospital, they were noted in 12 out of 45 subjects who had had *Staphylococcus aureus* infections at death (though they had not necessarily in all cases died from such infections). In addition to these 12 cases out of the 45, there were seven in which the lesions were described as being either abscesses or septic thromboses with pyæmic foci. The twelve cases are epitomized below. The infarct-like areas—or if these do not occur, diffuse hæmorrhagic areas—are so characteristic of the cases of staphylococcal pneumonia encountered here that we usually recognize them as such at the time of the autopsy and before cultures have been attempted.

Summary of Cases.

Post-Mortem Examination 37/35.—The subject was a male, aged forty-seven years. He had suffered from extensive pyæmic pneumonia (*Staphylococcus aureus*). Infarct-like areas were found, often with whitish peripheries and much congestion. Cloudy swelling of the kidneys and liver was present. The spleen was firm and not enlarged.

Post-Mortem Examination 1/36.—The subject was a female, aged twelve years, who had suffered from hæmorrhagic arthritis of the right hip. Pyæmic pneumonia (*Staphylococcus aureus* infection) with infarct-like foci was found. A pleuritic exudate was present on the left side.

Post-Mortem Examination 12/36.—The subject was a male, aged fourteen years. He had had a *Staphylococcus aureus* infection of the nose with deep-seated pus, yellow-tinted œdema of the temporal region and probably thrombosis of the cavernous sinuses. Numerous red infarct-like pyæmic foci were found in the lungs. Cloudy swelling of the liver and kidneys was present.

Post-Mortem Examination 168/37.—The subject was a female, aged sixteen years, who had suffered from agranulocytosis of uncertain cause. Necrotic pharyngitis and œsophagitis were present, with extension to the vocal cords; microscopic examination revealed colonies of *Staphylococcus aureus* and hyphæ of *Oidium*. Infarcts were found in the lungs. The spleen was dark plum-coloured; it weighed 375 grammes. The liver weighed 1,919 grammes. The marrow of the sternum was slightly red, and that of the femur was red and soft.

Post-Mortem Examination 38/39.—The subject was a male, aged fourteen years, who had suffered from a *Staphylococcus aureus* infection of the subcutaneous and deeper tissues of the left lower temporal area. Pyæmic abscesses and infarct-like areas were found in the lower lobes of the lungs. A large drained empyema was found on the right side, a small drained empyema on the left. The infarct-like area was breaking down, and blood was escaping through the empyema drainage incision. The stomach was full of blood, apparently from this source. Cloudy swelling of the liver and kidneys was present. The spleen was slightly enlarged and somewhat soft.

Post-Mortem Examination 255/40.—The subject was a female, aged twenty-seven years. Pyæmic foci were found in both lungs, with congestion and a large infarct of some standing in the lower lobe of the right lung and pleuritic exudate on the right. The spleen was enlarged, and contained pyæmic foci and probably infarcts. A *Staphylococcus aureus* infection was present. Cloudy swelling of the kidneys was apparent. An abortion had recently been produced, and in the placental remains masses of cocci were found.

Post-Mortem Examination 141/41.—The subject was a male, aged seventeen years. He had suffered from acute (probably myeloblastic) leuchæmia and epistaxis. The liver was enlarged (its weight was 2,029 grammes) and its appearance suggested the presence of hæmosiderin. The spleen was red and not enlarged (weight 113 grammes). Petechiæ were present in the lungs and pericardium. A number of infarcts with eroded surfaces were found in both lungs; culture yielded a growth of *Staphylococcus aureus*. Slightly enlarged, red tracheal glands were observed. In the bladder a necrotic ulcer with hæmorrhage was found. A Meckel's diverticulum was present.

Post-Mortem Examination 339/42.—The subject was a female, aged fifty-nine years, who had suffered from anuria and had undergone decapsulation of the left kidney. The kidneys were very large; the left kidney, which was deep red, weighed 461 grammes, and the right, which was mottled, weighed 449 grammes; infective nephritis had produced these changes. The right renal pelvis was dilated with an irregularly shaped phosphatic calculus and grit. Scattered red infarct-like areas with pin-point abscesses were found in the lungs, and an exudate was present over the base of the right lung. The spleen was large (weight 419 grammes) and retained its shape. Cloudy swelling was present in the liver, which weighed 2,567 grammes. Culture yielded a growth of hæmolytic staphylococci.

Post-Mortem Examination 352/42.—The subject was a male, aged fifty-four years. An empyema was present on the left side (culture yielded a growth of *Staphylococcus aureus*), with diffuse consolidation in the lower lobe of the left lung, probably on an old infarct-like area; the rest of the left lung was compressed. A softened and necrotic patch was found in the left parietal lobe of the brain. Dark red clots were present in the left popliteal artery extending to the external iliac artery; they were probably ante-mortem clots. The left leg was œdematous. Speckled clots were present in branches of the pulmonary artery. The heart was hypertrophied (weight 568 grammes).

Post-Mortem Examination 71/43.—The subject was a male, aged fifty-three years, who had fallen into a ship's hold and sustained a compound fracture of the left forearm. Seventeen days prior to the autopsy amputation had been performed through the upper part of the left arm on account of swelling. The surface of the gaping stump was necrotic, and yielded a profuse culture of hæmolytic staphylococci. Œdema and congestion of both lungs were found, and at both lung bases several small infective infarcts were present. Cloudy swelling of the liver (weight 2,524 grammes) and of the kidneys (weights 227 and 289 grammes) was present.

Post-Mortem Examination 14/44.—The subject, a male, aged fifty years, had contracted an infection of a wound in the scalp following the excision of a wart. He suffered from Staphylococcal pneumonia. Several deeply congested areas with necrotic centres (1·0 to 1·5 centimetres in diameter) and smaller deeply congested and infarct-like areas were detected in the lungs; the lungs were generally congested. The spleen was not enlarged.

Post-Mortem Examination 178/44.—The subject was a male, aged forty-five years, who had undergone surgical removal of a carcinoma of the transverse colon. An infected "drip" incision was present, and ante-mortem clots were found in the left femoral and common iliac veins extending into the *vena cava*. Numerous foci of *Staphylococcus aureus* with eroded surfaces and small abscesses surrounded by much congestion were found in the lungs. An independent carcinoma of the caecum was detected.

Reviews.

BUCHANAN'S ANATOMY.

"BUCHANAN'S MANUAL OF ANATOMY", by Professor Wood Jones and associated authors, is the seventh edition of this work, which first appeared in 1906.[1] Its fifteen hundred odd pages rather belie the description "Manual", though it is some one hundred and fifty-six pages shorter than the sixth edition of nine years ago. It will appeal to those who prefer a regional to a systematic textbook, although in certain chapters the systematic method is adopted.

There is an excellent section on the development and growth of the human body. The distinguished author quotes Samuel Butler as saying that "although newborn babies know a very great deal about their mothers, young mothers know very little about their babies", and the former goes on to add that he might well have included medical students and many medical practitioners. The anatomy of the various ages of man is dealt with in a most interesting and instructive manner. We need in other departments of medical science more teachers who are capable of dealing with man's mental and physical make-up from birth to death, but perhaps this is too much to expect in this age of specialization.

Much of Professor Wood Jones's previous work has been introduced into the sections on the limbs, as will be observed by those familiar with "The Principles of Anatomy as Seen in the Hand" and "Structure and Function as Seen in the Foot".

Another excellent chapter is that which deals with the nervous system. Much ground is covered in a relatively small space, but the account of the various structures and their relationships is clear and concise. It is also pleasing to note that there are here included brief descriptions of certain clinical neurological conditions.

Parts of other chapters are not so well done as this one, in that notice has not been taken of new facts that have been discovered by careful methods of study in the living as well as in the dead. This neglect was all very well at the time of the original publication of the book, which was designed as a guide to structure as revealed in the process of dissection. This criticism applies equally to most contemporary textbooks of anatomy, for example, most descriptions of the fasciæ of the body differ widely from their appearance in the living. Similar criticism applies to the important subject of movement. There are great differences in the various textbook accounts of the action of muscles, and indeed many of these accounts appear merely to be copied from textbook to textbook.

A vast amount of work has been done in recent years both by anatomists and by clinicians on the subject of kinesiology, and in the place of pontificial statements on the action of individual muscles, there are available instead logical explanations of movement based on careful clinical observation and experiment. One would like to see in future editions a chapter on movement of similar standard to that on development. It may here be noted in passing that the statement that "By far the greater part of this movement [inversion and eversion of the foot] occurs at the subtaloid joint . . ." is not borne out by other authorities, nor does there appear to be any radiographic evidence to support this claim.

There are two notable changes from the last edition. The first is the exclusion of all colour from illustrations (which are very numerous and helpful, there being many new ones by the author). The second is the deletion of the greater part of the matter dealing with embryology, which had become "increasingly elaborated in later editions"—this section was edited by the late Professor Frazer. Perhaps the pruning of embryology has been too thorough, for clear accounts of certain parts of this subject are a very great help to the understanding and appreciation of the anatomy of a number of regions in the body.

With regard to illustrations, it might perhaps be pointed out that Figure 526 on page 913 is not a true representation of the actual condition as seen in the living. A coloured photograph or drawing would be of much greater value to students, particularly in a region such as this (the anal canal), where the appearance in the cadaver is so different from that seen in life.

In spite of the foregoing criticisms, this volume ranks amongst the best of works of its kind. In addition to the line drawings there are some very clear X-ray plates. The printing is very well done, and as well as the glossary of previous issues there are biographical notes of anatomists and others whose names appear eponymously in the text.

The frontispiece is a photograph of Professor Buchanan in the later years of his life—a distinguished looking bearded gentleman who does not appear too pleased at sitting for his photograph. Australian students and practitioners should welcome this work by Professor Wood Jones and his associates at Manchester.

[1] "Buchanan's Manual of Anatomy", edited by F. Wood Jones, D.Sc. (London, Adelaide and Melbourne), M.Sc. (Manchester), M.B., B.S. (London), F.R.S., F.R.C.S. (England), assisted by E. L. Patterson, M.D., B.Sc. (Manchester), T. E. Barlow, M.D. (Manchester), M.R.C.S., L.R.C.P., S. Mottershead, M.D., B.Sc. (Manchester), F.R.C.S. (England), F. R. Wilde, M.B., Ch.B., B.Sc. (Manchester), F.R.C.S. (England), and Jessie Dobson, M.Sc., B.A. (Manchester); Seventh Edition; 1946. London: Baillière, Tindall and Cox. 9" × 6", pp. 1,628, with 895 illustrations. Price: 45s.

MENSTRUAL DISORDERS AND STERILITY.

THOSE who are interested in the gynæcological side of medicine will welcome an unusual addition to books on this subject in "The Diagnosis and Treatment of Menstrual Disorders and Sterility" by Charles Mazer and S. Leon Israel.[1] This is a nicely produced book with good print on excellent quality paper. The illustrations (especially the photomicrographs) are of high standard and relevant to the text. For those who wish to follow up in more detail any reference there is an exceptionally full bibliography at the end of each chapter.

In a clinical approach to the subject of menstrual disorders, these are discussed under their main symptoms: dysmenorrhœa, amenorrhœa and uterine bleeding. This makes for ease of reference by the busy general practitioner. One useful chapter is devoted to puberty in the female and the relation of the endocrine glands to the problem of this age group; especial emphasis is laid on pituitary dysfunction. Another good chapter deals with premenstrual tension—a subject usually neglected in textbooks—followed by a discussion of mentrual migraine and breast hyperplasia. Discussing the treatment of primary dysmenorrhœa with insulin, the authors claim 10% permanent cure. This shows rather more optimism than gynæcologists in this country allow themselves.

The latter half of the book is devoted to an essentially clinical approach to the problem of sterility. It is pointed out that there is more to this than "potent males and patent tubes". There are five main ætiological factors requiring investigation in every barren couple: grossly recognizable pelvic conditions, insemination of the cervix, the tubal factor, the endocrine factor in the female, the male factor. These are capably dealt with *seriatim* on usually accepted lines.

In the Huhner test many workers would consider the standard of normality set by these authors as particularly high, that is, more than fifteen migrating spermatozoa per high-power field. Routine endometrial biopsy is not given much place or description as the authors advocate curettage of the uterus in its place. Nevertheless, when they are reported on by an experienced pathologist, much accurate information can be obtained from endometrial biopsies, particularly if repeated on several occasions. Most gynæcologists would disagree with the authors as to the relative severity of the two procedures.

There is an appendix of commercially available standardized endocrine products. This will be particularly useful to the younger graduate who is not familiar with "trade names". It is a pity that mention is omitted of "Serogan" and "Œstroform"—two of the most commonly used of these products in Australia.

While the authors assert that their book is written for the student and general practitioner of medicine, the subjects covered are summarized in a way that will appeal to many a specializing gynæcologist. The book is particularly easy to read and can be thoroughly recommended.

[1] "Diagnosis and Treatment of Menstrual Disorders and Sterility", by Charles Mazer, M.D., F.A.C.S., and S. Leon Israel, M.D., F.A.C.S.; Second Edition; 1946. New York, London: Paul B. Hoeber, Incorporated. 9¼" × 6¼", pp. 584, with many illustrations. Price: $7.50.

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INTELLIGENCE, FERTILITY AND THE FUTURE OF THE RACE.

ONE of the most urgent needs of the British peoples after the recent devastating war is for young men and women who are able to take a leading part in professional, commercial and industrial life. Before September, 1939, the direction and control of life in all its branches were becoming more and more difficult, and the tendency to specialization was becoming not only more fashionable but more necessary than ever before. The war caused the death of many who were already taking a leading part or were destined to become leaders in society. In addition, the war itself led to the speeding up of scientific research with the result that discoveries were made sooner than they would otherwise have been made, and new and unexpected truths were revealed. Medical people in Australia, for example, find a result of these happenings in the present shortage of specialists. For more than seven years there has been no regular training of young men and women to fill the specialist ranks, and the same kind of thing is taking place in other walks of life. In an issue of *Planning* last December (Number 259) special attention was devoted to Britain's need for brainpower. "PEP" (Political and Economic Planning) in a previous issue of this interesting publication showed that a full employment policy, even if no special labour difficulties had been brought about by the war, would create the need for a considered manpower policy, and the conclusion was reached that the quantity and quality of the labour force could no longer be assumed but had to be carefully studied and planned. Incidentally it may be pointed out that, according to the British Government's White Paper, "An Economic Survey for 1947", presented by the Prime Minister to Parliament in February, 1947, the labour force of 18,300,000 men and women envisaged for December, 1947, "falls substantially short of what is needed to reach the national objectives". At the moment, however, we are concerned with the need for brainpower or, as *Planning* calls it, the manpower requirements of the professions and the upper ranks of industry, commerce and the public service. It is pointed out that a shortage of persons qualified to fill professional and administrative posts "may" seriously impede the nation's recovery and its economic and social progress. The word "may" in the last sentence should surely be changed to "will", because the efforts that are being made to increase rapidly the efficiency of industry and to develop health, education and other social services create a much larger demand on the type of person in question than could be met even if the pre-war level of recruitment had been maintained. Clearly the best possible use will have to be made of the nation's reserve of brainpower. Deficiencies in the quantity of labour must, we are told, be compensated for by improvements in quality. "While there may be exceptions to the rule, it is generally true that the higher the level at which those improvements are achieved, the greater the return in terms of efficiency at all levels." Though the deficiency figures given for Britain will not be applicable to Australia, they will give an indication of the general trend that Australian figures would be likely to take. The Barlow Committee on Scientific Manpower reported in 1946 that the pre-war annual output of 2,500 pure scientists in Great Britain should be doubled as soon as possible. The future demand for technologists was thought to be more debatable, but the Barlow Committee expressed the view that the proportionate increase in the number of students of technology should not be less than that recommended for pure science. A smaller increase in the number of medical practitioners is needed; it is estimated that the required number could be reached if the number of admissions to the medical register, which averaged 2,006 a year in the five years before the war, was increased by about 15% for six years. There is at present a serious shortage of dentists, and this is likely to become more acute with the growing realization of the importance of dental care. The Inter-Departmental Committee on Dentistry (the Teviot Committee) recommended that the pre-war output of 340 dentists a year should as soon as possible be increased to at least 800 a year. The two professions in which greatly increased numbers will be required are those of teaching and nursing. In regard to the future requirements for arts graduates no clear-cut answer is thought to be possible. An interesting discussion on arts courses is included; it will suffice to refer to the conclusion that the community needs more men and women with the broad vision and lively critical faculty which a liberal education is designed to foster. In regard to business management, it is stated that the shortage of competent managers was a more serious threat to the war effort than the shortage of research workers and that post-war production is equally dependent upon a supply of really good managers.

From the point of view of the immediate future these statements are disturbing enough, but if we try to take a long-range view they will be even more arresting. It may be objected that the matter is not one that should concern the medical profession more than any other group in the community. The real point of course is that medicine must bear its full share of communal responsibility. In any case special mention has been made of the profession of medicine and also of the professions of dentistry, nursing and teaching, in which medicine must take a

lively interest. Moreover, general science, shown by the Barlow Committee as meriting the most serious attention, has tentacles which extend into and are interwoven with the roots of medicine, dentistry, nursing and teaching. The long-range view in this matter should be considered in the light of a recent declaration that the average level of intelligence among the population is declining. In *The Times* of December 30, 1946, it is recorded that at the request of the Royal Commission on Population, Professor Sir Cyril Burt has surveyed the evidence on the relation between intelligence and fertility and that his conclusions have been published in pamphlet form by the Eugenics Society. Unfortunately this pamphlet is not available for study. *The Times* points out that the birth rate shows wide differences in different families and in different sections of the community, and that the point is whether or not these differences are likely to alter the inherited mental qualities of the nation. Burt's data comprise the results of surveys of school populations by means of intelligence tests, and it seems "almost certain" that the larger the family, the lower the level of innate intelligence; and the more intelligent the parents, the smaller the families. This statement, together with the pronouncement that the average level of intelligence among the general population is declining, requires, we are told, some qualification and elaboration. It was found that children from the poorer social classes not only have an intelligence nearly two years below that of the children from the "better" social classes, but are drawn from families nearly twice as large. "Against this must, of course, be put the fact that because of their greater numbers the humbler social classes produce far more pupils of genuine scholarship ability than do the professional classes. What is a matter for serious consideration is the fact that in the far more numerous working class it is the most intelligent families who contribute fewest to the next generation." Burt has hedged his conclusions with many reservations, *The Times* remarks. It adds that if the decline described by him is prolonged, the effects may be grave—in a little over fifty years the number of pupils of "scholarship ability" will be approximately halved and the number of feeble-minded almost doubled.

Any efforts to cope with this enormous problem must be made in two directions: the first will be to try to stem the outgoing tide of intellectuality, and the second to make the best possible use of the human material that remains. If in both cases the aim is to create or to discover individuals with qualities of leadership, we shall have to be content, provided the whole community is covered in the process. There may be some persons who would regard the problem entirely from the eugenic point of view and who would seek a solution by devoting almost exclusive attention to human stock likely to produce the most intelligent type of individual, paying scant attention to the others and even going so far as to advocate sterilization of persons classified as unfit to reproduce their kind. Apart from the fact that extreme measures such as sterilization are likely to be ineffective, no economic discrimination in favour of certain supposedly intelligent persons would or should be tolerated in a community which sets out to provide equality of opportunity for all its members. The chief reasons why the most intelligent families in any stratum of society contribute fewer individuals than others to the coming generations are economic. All that society can do is to make it easier for young people to marry and to beget children. Marriage allowances and family endowment that is worthwhile should be arranged, with substantial remissions in taxation payments as the family grows. In regard to the utilization of the resources of existing manpower in the training of intelligent leaders, a great deal can be done by education, with one proviso: this is that there are enough suitable teachers to do the educating. By concentration on children of outstanding ability the future may be served. The questions of choice of a career by the young and the method of selection of young people for special education are subjects requiring separate discussions. *Planning* sums up the conclusion of its statement as follows:

> The objectives of securing an adequate flow of recruits into the various professions and at the same time of ensuring that they are of the highest possible quality will not be achieved by compulsion or restraint. They will be reached by two roads only—by the provision of an authoritative service of advice and information about the prospects of employment, methods of training and so on and by the removal of all barriers which have hitherto prevented suitable men and women from undertaking a university or professional training.

Though many of the barriers for the entrance of suitable students into the ranks of medicine have been removed in Australia, this is not true of all other callings which give opportunities for leadership. And even in medicine no one would suggest that nothing remains to be planned. The subject is one that calls for free discussion in every sphere of communal activity.

Current Comment.

REACTIONS FOLLOWING LUMBAR PUNCTURE.

THE occurrence of headache after lumbar puncture is not at all uncommon, and it is generally accepted that it is due to the continued leakage of spinal fluid from the site of the puncture in the dura. The amount of fluid withdrawn and the degree of reduction of the fluid pressure appear also to have a bearing on the appearance of after-symptoms. It has also been suggested that a contributory factor may be the temperament of the patient, and that the severity of headache and other varieties of temporary sequels may depend upon constitutional inadequacy. A carefully planned inquiry into this possibility is described in a paper by F. C. Redlich, B. E. Moore and I. Kimbell, junior.[1] In a brief review of the literature, they refer to the observations which have been made on the condition of the tissues surrounding the site of a lumbar puncture, and survey the evidence that has been arrayed in favour of the hypothesis that the chief cause of symptoms is trauma. There is undoubtedly a strong case: reactions are admitted to be much less frequent when a round needle is used, or one of small calibre. Measures which tend to raise the intracranial pressure have been found to relieve headache, and thus it seems likely that pain is caused by mechanical traction following a reduction of pressure. When this lowered pressure is maintained for some time by continuous leakage headache is naturally produced more easily. This explains also why the recumbent position gives relief. So far there are not likely to be any differences of opinion, though some authorities do not agree that rest after lumbar puncture always gives freedom from sequels. When we come to gauging the importance of the mental or temperamental factors it is not so simple. There are a number of reports in the literature which suggest that after-symptoms are more frequent in persons

[1] *Psychosomatic Medicine*, November-December, 1946.

who are highly strung or suggestible. The present authors attacked this problem by recording the results of lumbar puncture in a series of patients submitted to routine lumbar puncture in the psychiatric service of the Yale University School of Medicine. All patients who showed significant intellectual and emotional dissociation or lowered mental capacity or inability to express themselves were excluded. Their ages were representative of the whole ordinary span of adult life. Men and women were almost equal in numbers. Before performing a lumbar puncture the investigators made a careful estimate of the patients' intelligence, mood, emotional stability, and degree of anxiety or hypochondria, if any. In order to control evidence, which is largely a matter of individual opinion, this part of the inquiry was carried out by the same physicians on all the subjects. At the interview the patient was told what was proposed, and avoiding suggestion or the use of leading questions as far as possible, the examiner sounded him as to any views or prejudices he might have concerning the procedure. It might be thought that this technique would tend to swing the balance rather in favour of inducing or at least encouraging an undue degree of apprehension, but this does not seem to have been the case. The dependability of such investigation, of course, would largely depend upon the skill and tact of the physician. The little operation itself was carefully performed so as to cause the minimum of disturbance and pain; local anæsthesia was used. About ten cubic centimetres of fluid were withdrawn, and the pressure was observed. For eighteen to twenty-four hours afterwards the patients were kept in bed in the prone position and fluids were given freely. All symptoms were recorded, such as headache, giddiness, backache or nausea, and their degree was estimated. Statistical analysis was applied to the results, attention being paid to the age, sex and personality types of the patients, the severity of the reactions they suffered, if any, and their degree of anxiety towards the procedure both before and after it. Such analysis is not merely a matter of mathematical calculation. For instance, it is pointed out by Redlich, Moore and Kimbell that the semantic confusion often noted in psychiatric patients and others may invest some semi-technical words such as "spine" with an undue and sinister significance, and deeper mechanisms may also be at work. However, the final conclusions are interesting. The authors used needles of different calibre on two groups of patients of closely corresponding physical and mental states. They found that 54% of the total number showed after-symptoms; of these 74% reacted when a 16 calibre needle was used, but only 52% of those on whom a 22 calibre needle was used. Mild reactions occurred more frequently in those who showed some degree of anxiety; suggestion also appeared to be of some importance in the production of slight sequels. No relationship whatever could be established between the occurrence of symptoms and the intrinsic personality traits of the patients. Finally the authors conclude that the most important factors are those concerning the mechanical control of drainage through the puncture hole in the dura, and that these far outweigh the small contribution made by anxiety or suggestion.

MIGRAINE AND PERSONALITY.

WHAT is "still one of the most poorly recognized, poorly understood, and poorly treated of all the common tormentors of mankind"? Walter C. Alvarez holds that it is migraine, and as it is a malady that is not unknown personally to doctors amongst many others of the world's workers, most practitioners of medicine would surely agree with him. This well-known internist, who has mediated happily in his writings and beliefs between the apparently conflicting evidence concerning the organic and non-organic aspects of disease, has published an interesting study of the migrainous personality based on 500 cases.[1] He begins by remarking that we go on acting as if we still believed that we could find somewhere in the patient's body a localized cause for all the headaches to which he, or more usually she, is a martyr. Recollections of meetings at which symposia on migraine have been presented, and of interviews with much-investigated patients, will amply confirm this. Those who have read and enjoyed Oliver Wendell Holmes's "Breakfast Table" series will perhaps remember a sympathetic and humorous account of the profitless probings of all the specialists in the subject of sick headaches, even well back in the nineteenth century. Most of the 500 patients analysed by Alvarez were women. He describes the personality type as follows. The migrainous woman he finds hypersensitive, quick of thought and movement, easily tired, and easily made tense and nervous, a fast and accurate worker of the perfectionist order, but upset by anything out of the ordinary. He points out that sensitiveness to light may often be observed in the consulting room. The ease with which such persons may be fatigued is one of their greatest trials, a quality which the author believes is due to some inborn character of the nervous system. Like the headaches themselves, this symptom usually appears with striking suddenness. It is usually related to the distress caused by the impact of the trials of the patient's own world on a sensitive organism. Frequently repeated stimuli spell fatigue, either in the limited physiological sense or the more general connotation. Tenseness may result from even thinking about doing something. Alvarez thinks that the frequency with which the headaches start in the back of the neck is related to actual tenseness of the nuchal muscles. Certainly restless sleep in sensitive persons may induce this symptom. The occurrence of a headache when the strain is over is another characteristic feature. Though they are possessed of considerable charm, there is often also an element of masculinity in these women, who have little patience with feminine small talk. The writer has not found that there is any constitutional difficulty in marriage adjustment, but the temperament itself causes difficulties. He has found in men similar characteristics of make-up, showing the tenseness, the quick intelligence, and the alternation of "twilight spells" complained of by the female prototype. These latter, it will be agreed by all who have had experience with migrainous patients, are a striking characteristic. They are of great interest, especially to the physician of neurological bent, because of their affinities with similar states observed in some of the epilepsies. During such spells the patient is apathetic, dazed, and suffering somewhat from confusion, and without the accustomed bright alertness usually a feature of the personality. Like many other affective stigmata of disease, if indeed we may call migraine a disease, it is but a variant and an exaggeration of daily common experience. Alvarez points out that a good deal of the literature on the subject of migraine is confused by the failure to realize the modification of true migrainous phenomena by the superimposition of another harmful inheritance such as an allergic state, hypertension or psychopathic disorder. The two former, he remarks, may set the trigger so finely that it may almost spring of itself. This state of affairs may well happen in persons who have the migrainous temperament, but who have never had severe attacks, until perhaps some other constitutional physical factor upsets the delicate balance. The author's contention is that the reason for the frequency of allergic phenomena in the migrainous is the exaggeration of their response to all stimuli. One of his aphorisms is worth quoting; he says that "it is only a wise old clinician who can hope to unscramble the complicated story into its several components".

When we come to treatment it may be possible to help by remembering all the factors, and so advise the patient how to secure enough mental rest. The experience of Alvarez with sedatives and anti-convulsant drugs has, on the whole, not been favourable. He maintains that the astute physician should be able to pick these patients by their physical type, and points out that it is important to be able to get on the right track, for they do not always mention headaches as part of their malady. A positive approach such as this is a corrective to that prevalent devotion to the phrase so easily written even at the end of a sheaf of investigations: "Nil abnormal detected."

[1] *The American Journal of the Medical Sciences*, January, 1947.

Abstracts from Medical Literature.

MEDICINE.

Oral Penicillin in Gonorrhœa.

S. R. M. BUSHBY AND A. H. HARKNESS (*The Lancet*, November 30, 1946) have treated 62 patients suffering from acute gonorrhœa by the oral administration of six doses each of 40,000 units of penicillin and one gramme of sodium citrate punctually every three hours. The medication was contained in tablets each containing 20,000 units of calcium penicillin and 0·5 gramme of sodium citrate. The patients were not allowed to take more than one and a half pints of liquid during the treatment. The treatment cured the disease in all but four of the patients and two who became reinfected before tests of cure could be completed.

The Retinal and Chorioidal Arterioles in Malignant Hypertension.

F. R. MANLOVE (*Archives of Internal Medicine*, October, 1946) has measured the thickness of the walls and the diameter of the lumen of the arterioles of the retina and chorioid in eyes taken from persons who had died of malignant hypertension, and has calculated the "wall-lumen ratio" of these vessels. Normally the walls of the ocular arterioles are the thinnest in relation to the calibre of the vessel of any arterioles in the body except those of the lung; but it was found by comparison with normal controls that the wall-lumen ratio was decreased by an average of 56% in malignant hypertension—thus the ratio was reduced almost as much as in the kidneys and more than in the brain, liver and pancreas in this disease. The chorioidal vessels were much more affected than the retinal vessels by medial hypertrophy and intimal proliferation, and acute necrosis was seen occasionally; but no relationship was demonstrated between the state of the arterioles and the other retinal lesions. In fact, in several cases in which there were great numbers of retinal hæmorrhages and exudates, there was no arteriolar disease except a little medial thickening.

Changes in the P Waves in Rheumatic Fever.

JOHN J. SAMPSON AND PAUL C. KAPLAN (*The American Journal of the Medical Sciences*, September, 1946) report upon a study of the alteration of the electrocardiographic *P* waves in acute rheumatic fever. Sixty patients with acute rheumatic fever were selected for detailed study, and significant changes in the *P* waves of the electrocardiogram were observed in eight and questionable alterations were noted in another seven of the patients. The changes consisted of distinct flattening or inversion of the *P* waves and they occurred most frequently in lead III and lead II, but were also observed, though less commonly, in lead I and lead IV. The alterations in the *P* waves generally paralleled the clinical evidences of active recovery. The authors consider that these *P* wave deviations are diagnostically important in that they often occur unaccompanied by other electrocardiographic abnormalities, and occasionally during periods when clinical signs of active rheumatic fever are associated with normal temperature, leucocyte count and erythrocyte sedimentation rate.

Treatment of Graves's Disease.

J. H. MEANS (*Annals of Internal Medicine*, September, 1946) presents an evaluation of the several methods for treating Graves's disease available today. He states that, in the past, iron, arsenic, digitalis, ergot, hydrocyanic acid, quinine, thyreoid gland and iodine have been tried as therapeutic agents; prolonged rest, electricity, hydrotherapy and antisera have also been used, but none of these measures, except iodine, has been of significant benefit. The author proceeds to appraise the more modern methods of subtotal ablation of the thyreoid gland and the irradiation of the thyreoid by means of radioactive iodine. These measures are used with the purpose of reducing the thyreotoxic component of Graves's disease. The author is of the opinion that the combination of thiouracil and iodine together achieves the nearly perfect pre-operative preparation; the patient is transformed to a euthyreoid state and the thyreoid gland is involuted and easy for the surgeon to deal with. The operative and immediate post-operative course of patients so prepared is smoother and freer of complications and it is possible to omit both drugs on the day of operation. Of the use of thiouracil alone as a method of treatment the author states that, if given long enough and in sufficient dosage, the drug will produce a remission in any patient with Graves's disease, and that such a remission will continue as long as the drug is given uninterruptedly. However, the toxic reactions of the drug, the recurrences after cessation of treatment, and the cases of aggravation of the ophthalmopathy are the drawbacks of thiouracil therapy. In comparing the efficacy of thiouracil and surgery in treatment, the author states that with drug therapy there is no greater risk and the ordeal of a surgical operation and the cost of hospitalization is avoided. However, the danger of death from operation does not extend usually over more than twenty-four hours, whereas the danger of agranulocytosis due to the drug, with possible death therefrom, continues as long as the drug is exhibited. From the point of view of psychic trauma, both to the patient and to the doctor, these time relations weigh heavily in favour of an operative programme. Also, the long-continued close observation of patients on drug therapy imposes a heavy burden on patient and doctor, which is much greater than in surgical treatment. Instances of persistence and remission following surgery amount to not more than 5% and evidently they are more common, so far, in the cases in which drug therapy alone is used. The incidence of tetany and vocal cord paralyses, transient or permanent, should not be much more than 1% in the hands of expert thyreoid surgeons. The production of myxœdema by either drug or surgical treatment need not give any concern, as that due to the drug clears up when the drug is stopped and that due to surgery can easily be controlled by the exhibition of thyreoid gland. The author is of the opinion that until more abundant data are available from recent work, the operative programme is preferable to that of prolonged drug therapy. However, he expects that drugs with less and less toxic effect will be developed and that eventually drug treatment will be preferred to operation. Radioactive iodine administration is certainly an effective way of causing a remission (perhaps permanent) in this disease, but it cannot be stated at the present time whether it is equal to or better than surgical ablation of the thyreoid gland or treatment with thiouracil. The author refers to the method of irradiation by X rays of the pituitary gland for Graves's disease and expresses the opinion that it will not survive in competition with other methods now available, there being the danger that some function of the pituitary gland other than the thyreotropic function may be destroyed.

Pentaquine in Malaria.

R. F. LOEB (*The Journal of the American Medical Association*, October 12, 1946) discusses the activity in animals and man of a new antimalarial agent called pentaquine. Pentaquine diphosphate is 6-methoxy-8-(5-isopropylaminoamylchloride) quinoline. It is rapidly absorbed and excreted; its toxicity is less than that of pamaquine, which it resembles in many ways. Anorexia and abdominal discomfort have been noted, and syncope occurred from postural hypotension in two out of twenty subjects who received ninety milligrammes *per diem*. Severe anæmia occurred in one subject out of 171 treated. For prophylaxis pentaquine was found to be too toxic for general use. Treatment with pentaquine of heavy infection with the Chesson strain of *Plasmodium vivax*, which has a high relapse rate, was ineffective in preventing relapses, unless the treatment was combined with the administration of two grammes of quinine per day; but the exhibition of 60 milligrammes of pentaquine with two grammes of quinine daily prevented relapse in 16 of 17 patients treated over two weeks.

Chronic Nephritis.

PASTEUR VALLERY-RADOT AND P. DELAFONTAINE (*La presse médicale*, November 9, 1946) discuss the classification of chronic nephritis. Following Widal, they state that an anatomical or pathological classification of nephritis is impossible, and they suggest that a clinical appreciation may be made on the following lines: (i) chronic nephritis with a variable amount of albuminuria and of red cells and casts in the urine, discovered by chance, of uncertain ætiology and with a tendency to recovery after a varying interval; (ii) œdematous chronic nephritis controlled by limitation of chloride intake and tending to azotæmia; (iii) chronic azotæmic and hypertensive nephritis of young persons, progressive and dominated by the high blood urea content; (iv) chronic hypertensive nephritis with or without azotæmia, giving rise to cardiac or vascular accidents, and influenced by the varying blood urea content; (v) *néphro-hypertension de la cinquantaine*, discovered accidentally at about the age of fifty years; (vi) malignant hypertension of young adults; (vii) chronic nephritis with hæmaturia, persistent or intermittent, which may recover or progress to renal insufficiency; (viii) mixed types following infection. The authors state that in many of the nephritic conditions men-

tioned, the origin, if discovered, is often infective, and in particular a sore throat or tonsillitis often precedes the onset.

Bacillary Dysentery.

H. J. SHAUGHNESSY *et alii* (*The Journal of the American Medical Association*, October 19, 1947) describe a series of experimental studies in human bacillary dysentery. Graded doses of living bacillary dysentery organisms (Shigella) were fed to human volunteers. Various strains of Shigella were used to make vaccines for prophylactic purposes. One group of volunteers was immunized with 2·5 millilitres of irradiated polyvalent vaccine containing 4·8 billion organisms per millilitre and another group with 2·5 millilitres of heat-killed polyvalent vaccine. A third group was unvaccinated controls. One hundred million, one billion and ten billion Flexner W organisms were fed to the different groups in water. Within twenty-four hours in most cases the larger doses produced symptoms and signs of bacillary dysentery. The vaccines had no significant effect in preventing the disease, which was effectively controlled by sulphadiazine in doses of one grain per pound of body weight given in four divided doses for five to seven days. Paregoric and bismuth were given for diarrhœa. Sulphadiazine in the same doses also reduced the carrier rate.

Alcohol.

G. MOURIQUAND, J. COISNARD AND V. EDEL (*La presse médicale*, November 2, 1946) describe researches into the effect of alcohol on the vestibular index. The authors allude to a variety of substances which raise or depress the vestibular index, but they are mainly concerned with wine. They gave increasing quantities of wine of a strength of 8% to 9% to a series of experienced subjects. The wine was administered on an empty stomach so as to avoid any effect from other ingested foods or liquids. After sixty millilitres of wine had been taken there was a rapid rise in the vestibular index, which persisted for 22 minutes and was followed by a gradual fall. The ingestion of 100 millilitres of wine produced a higher curve with a fall below the base line, followed by a return to normal about the third hour. The ingestion of 200 millilitres produced a similar curve, but ingestion of 500 millilitres produced a rapid rise followed by a fall below normal, the subject being gay and excited and in the early stages of intoxication. This was called a subtoxic dose, the smaller dose being classed as therapeutic or alimentary.

New Drugs in Epilepsy.

H. L. KOZOL (*The American Journal of Psychiatry*, September, 1946) reports the results of treatment of 104 epileptics with a relatively new drug, 3-methyl 5, 5-phenyl-ethyl-hydantoin, temporarily called phenantoin. Phenantoin was first administered to patients having frequent epileptic attacks in spite of maximal doses of "Dilantin Sodium", to patients who had suffered gingival hypertrophy from the use of "Dilantin Sodium", and for other reasons, including the appearance of a rash. In the entire series of 104 patients there was an approximate reduction of 20% in the frequency of the seizures. However, if a selected group of 62 patients (60% of the whole series) is taken, the reduction was to one-tenth (90% improvement). The average duration of the longest interval between attacks was increased from 70 days to 138 days. In the selected group of 62 patients, the average interval was increased from 66 days to 200 days. The condition of 62 patients was greatly or moderately improved by treatment with phenantoin. The author states that one of the principal values of phenantoin is that it can be administered in substantially larger doses than either "Dilantin Sodium" or phenobarbital. Its principal drawback or side-effect is that it tends to produce drowsiness; this, however, can generally be eliminated or obviated by gradual increases in dosage. Phenantoin has no disagreeable taste; no patient receiving it suffered from hypertrophy of the gums, hirsutism or gastric distress. Rash appeared in about 10% of the patients, but some were successfully desensitized. The toxicity of the drug appears to be low. A useful synergism exists between phenantoin and "Dilantin Sodium"; neither enhances the undesirable and limiting side-effects of the other. It is possible to push both drugs to the limit of tolerance. The author utters a warning that, although the drug seems to have been spectacularly effective in some of his cases, tolerance to phenantoin may later develop and the patient's condition regress.

W. G. LENNOX (*ibidem*) discusses the use of trimethyloxazolidine dione in epilepsy. He states that he has found this drug, referred to as tridione, of great value in the treatment of seizures of the *petit mal* type—pycnoepilepsy, myoclonic jerks and akinetic epilepsy. The results in other types of seizures have been discouraging. When benefit follows the use of tridione in combination with some other drug such as "Dilantin", it is hard to say which is responsible for the improvement. Because many physicians have reported relief of psychomotor seizures with "Dilantin" alone, and no patient so affected has benefited from tridione alone, the author believes that the burden of proof lies with the proponents of tridione. The administration of tridione was followed at times by skin reactions and photophobia. Some patients experienced a sedative effect, others became more active and irritable. Some of the patients rendered free from seizures have improved in school work, disposition and general well-being. The author believes that at present no statement regarding long-term good or bad effects of tridione can be made, and that investigation should be continued.

Peripheral Neuritis.

L. C. KOLB AND S. J. GRAY (*The Journal of the American Medical Association*, October 12, 1947) describe seven cases of localized peripheral neuritis in patients receiving penicillin by the intramuscular route. Application of penicillin to the brain has been known to cause convulsions, and lesions of the spinal cord and nerve roots have followed intrathecal administration of penicillin for pneumococcal meningitis. In the seven cases reported the peroneal nerve, the sciatic nerve and the fifth and sixth cervical portions of the brachial plexus were affected. The penicillin was injected into buttocks or thighs in all cases except one. Pain was absent, motor palsy was severe. The onset of neuritis occurred ten to twenty-one days after the first injection of penicillin. There was slight impairment of sensation. Recovery of function occurred within four months except in two patients with lesions of the brachial plexus, in whom muscular weakness persisted for over seven months. Muscular atrophy developed in these patients.

Powdered Human Blood Cells in the Treatment of Ulcers.

M. W. ANDERSON *et alii* (*American Heart Journal*, December, 1946) have reviewed the treatment of patients with chronic ulcers of the extremities at the Mayo Clinic by the local application of powdered human blood cells. Their impression is that in about half of the patients healing is much accelerated, but that in the rest healing is no more rapid than it would be if other bland substances were applied. The treatment is regarded as supplementary to and not as a substitute for measures to improve the circulation.

Ménière's Syndrome.

MILES ATKINSON (*Archives of Otolaryngology*, October, 1946) asks whether the basic fault in Ménière's syndrome is a dysfunction of the capillaries. Production of endolymph is assumed to result from diffusion or secretion from the *stria vascularis*, and absorption has been shown to take place through the *saccus endolymphaticus*. The original finding of Hallpike and Cairns, subsequently confirmed by others, that there is a gross dilatation of a large part of the endolymphatic system, is being accepted as the characteristic pathological feature. This dilatation can come only from overproduction of endolymph or from defective absorption or from a combination of the two. The various theories which have found support in clinical experiment are considered in relation to the hypothesis that overproduction from the *stria vascularis* is the probable causative factor of the dilatation. Mygind and Dedering's theory is of faulty water metabolism with probable cellular œdema due to capillary dysfunction. Furstenberg's contention that there is a sensitivity of certain tissues to the sodium ion may be explained on the theory that with restriction of salt the tissues have less avidity for water or that there is a lessened permeability of the capillaries. Successful treatment following the administration of potassium chloride in place of sodium chloride may be attributable to the diuretic action and to the stimulation of sodium chloride excretion. The good results obtainable from histamine administration are attributable to vasodilatation in Atkinson's vasospastic group, and to desensitization of the histamine-sensitive group with resulting lessened capillary permeability. The beneficial effect of nicotinic acid in Atkinson's histamine-insensitive cases is apparent in the powerful vasodilator action of this drug, with resulting improved oxygen supply and relief from anoxæmic capillary damage due to the preexisting vasospasm. In cases believed to be due to allergic sensitivity to certain specific substances the major physiological disturbance is increased permeability of the capillaries. Vitamin *C* deficiency and toxic focal infection have each been put forward as causative factors in some cases of Ménière's syndrome. Capillary damage and increased permeability may explain these cases also.

Bibliography of Scientific and Industrial Reports.[1]

THE RESULTS OF WAR-TIME RESEARCH.

During the war a great deal of research was carried out under the auspices of the Allied Governments. It has been decided to release for general use a large proportion of the results of this research, together with information taken from former enemy countries as a form of reparations. With this end in view, the United States Department of Commerce, through its Publication Board, is making a weekly issue of abstracts of reports in the form of a "Bibliography of Scientific and Industrial Reports". This bibliography is now being received in Australia, and relevant extracts are reproduced hereunder.

Copies of the original reports may be obtained in two ways: (a) Microfilm or photostat copies may be purchased from the United States through the Council for Scientific and Industrial Research Information Service. Those desiring to avail themselves of this service should send the Australian equivalent of the net quoted United States price to the Council for Scientific and Industrial Research Information Service, 425, St. Kilda Road, Melbourne, S.C.2, and quote the PB number, author's name, and the subject of the abstract. All other charges will be borne by the Council for Scientific and Industrial Research. (b) The reports referenced with an E number may be obtained in approved cases without cost on application to the Secondary Industries Division of the Ministry of Post-War Reconstruction, Wentworth House, 203, Collins Street, Melbourne, C.1. Copies of these are available for reference in public libraries.

Further information on subjects covered in the reports and kindred subjects may be obtained by approaching the Council for Scientific and Industrial Research Information Service, the Secondary Industries Division of the Ministry of Post-War Reconstruction, or the Munitions Supply Laboratories (Technical Information Section), Maribyrnong, Victoria.

PB 31890. BALE, W. F. Health protection in the production and use of atomic energy. *March, 1946. 10 pp. Price: Microfilm, $1.00; Photostat, $1.00.*

This speech, released through the American Association for the Advancement of Science on March 27, 1946, emphasizes the importance of the maintenance of proper conditions of human safety both in the actual use of atomic energy and during the manufacturing operations leading to its use. The feasibility of adequately protecting personnel against radioactivity in fixed-site power production has been demonstrated by the safe operation of the Hanford Piles in which plutonium is produced. Strict supervision of the commercial use of nuclear energy by authority of the Federal Government is advocated.

PB 23851. FRINGS, HUBERT W., AND O'NEAL, BONNIE R. The location and thresholds of the contact chemoreceptors of the female horsefly, *Tabanus sulcifrons Macq.* (CWS Medical Div. Rept. 74.) February, 1946. 17 pp. Price: Microfilm, 50c.; Photostat, $2.00.

The object of the experiments reported was to locate the contact chemoreceptors of a representative horsefly and to study some of their properties. These data are of importance for an understanding of the action of repellent compounds on these economically important forms. Proboscis extensions were elicited from female horseflies when a 2 M sucrose solution was touched to the ventral sides of the four distal segments and distal half or two-thirds of the first segment of the tarsi or to the medium-sized hairs of the labella. Contact of this solution with other parts of the body brought forth no responses. Removal of the labella and immobilization of the legs so that the tarsi were inactive destroyed the ability of the insects to distinguish sucrose solution or NH_4Cl solution from water. The tarsal threshold for sucrose solution was 0·06 M and the labellar threshold was 0·02 M. The tarsal contact chemoreceptors allow the flies to distinguish acceptable solutions from unacceptable. It was concluded that the horsefly, *Tabanus sulcifrons*, possesses contact chemoreceptors only on the ventral sides of the four terminal segments and the distal half or two-thirds of the first segment of the tarsi and on the labella. The receptors are medium-sized hairs found near the margins of the labella and among the larger hairs on the tarsi; however, these may not be the only receptors on these parts. The tarsal chemoreceptors allow the fly to distinguish between acceptable (sucrose) and unacceptable (sucrose *plus* electrolytes) solutions. The order of thresholds of rejection of the electrolytes is similar to that for the other insects studied thus far and possibly to that for man. The changes in thresholds for sucrose and NH_4Cl during starvation were found to exhibit no clearly marked trends. Bibliography.

PB 23031. KING, BARRY G., *et alii.* Evaluation of the emergency breathing procedure (voluntary pressure breathing). (Bur. of Medicine and Surgery Res. Project X-291, Rept. 1.) June, 1944. 26 pp. Price: Microfilm, 50c.; Photostat, $2.00.

This study is concerned with the relative effectiveness of the emergency breathing procedure (to sustain aviation personnel suddenly deprived of oxygen at oxygen altitudes) and of hyperventilation. Periods of emergency breathing procedure, normal breathing and hyperventilation were carried out at simulated altitudes of 18,000 to 20,000 feet; a few experiments were carried out at 25,000 feet. Figures 1-8 show that oxygen saturation increases with the increasing ventilation rate. The tests conducted at a simulated altitude of 25,000 feet indicate that this altitude is the maximum at which air breaking can be carried out with even moderate success. Figure 6 illustrates the results obtained by hyperventilation induced through exercise—pedalling a bicycle. On the basis of the present work, it is doubtful whether a large percentage of flight personnel will be able to attain the required degree of proficiency without intensive training. One table, two protocols, thirteen figures and a bibliography are attached.

PB 23052 and PB 23053. LUYKX, H. M. C. Motion sickness preventives. (Bur. of Medicine and Surgery Project X-325, Memo. Rept. 1 and 2.) April, 1944, May, 1944. PB 23052, 11 pp; PB 23053, 14 pp. Price each: Microfilm, 50c.; Photostat, $1.00.

These two memoranda record the administration of lactose as a *placebo* and the following three motion sickness remedies: (1) United States Army development type containing hyoscine hydrobromide 0·43 milligramme, atropine sulphate 0·32 milligramme and "Sodium amytal" 130 milligrammes; (2) hyoscine hydrobromide, British, 0·65; (3) Royal Canadian Navy remedy containing hyoscine hydrobromide 0·32 milligramme, hyoscyamine hydrobromide 0·87 milligramme and niacin 150 milligrammes. Records were obtained on 4,048 subjects, in about thirty LST ships, on a total of fifteen different days. In comparing the three remedies with each other, there is no evidence that any one was more effective or less effective than any of the others. All these hyoscine-containing remedies seem to be effective in preventing seasickness under moderate conditions of roughness. In the second memorandum an attempt is made to analyse the data obtained on subjects with sea-going experience, subjects who had duties to perform, and subjects who were sick prior to the administration of the remedy.

PB 23036. PFEIFFER, C. C., *et alii.* The use of a quinacrine dermofluorometer to measure tissue quinacrine levels of subjects on suppressive therapy. (Bur. of Medicine and Surgery Res. Project X-429, Rept. 3.) February, 1945. 16 pp. Price: *Microfilm, 50c.; Photostat, $2.00.*

A portable quinacrine dermofluorometer was tested on a group of 36 subjects on suppressive quinacrine therapy. Over a period of two or three months the natural palmar skin fluorescence is relatively constant in control subjects. The right hand has a higher natural fluorescence than the left hand and females have more natural skin fluorescence than males. Subjects on a *régime* of quinacrine suppressive therapy show a gradual increase in the degree of induced palmar skin fluorescence which reaches a peak in four to five weeks. The induced quinacrine fluorescence decreases slowly over a twelve-week period after the drug has been discontinued. The average peak of induced fluorescence in males is 2·05 times the natural fluorescence readings. The average peak of induced fluorescence in females is 2·22 times the natural fluorescence readings. The range of natural skin fluorescence in males is from 30 to 90, compared to a deflection of 200 produced by a standard screen (1:2,000 quinacrine). The range of induced fluorescence of male subjects is from 90 to 150. A high degree of correlation of induced palmar skin fluorescence with mean quinacrine plasma level was found. In 33 subjects the correlation of body weight with the induced palmar skin fluorescence was significantly higher than the correlation of body weight with mean quinacrine plasma level. The induced palmar skin fluorescence is not altered by organic solvents or by prolonged immersion of the hands in water. It quinacrine is rubbed on the moistened palm an abnormally high reading results. A bibliography, three tables and four graphs are attached. See also PB 23034 and PB 23035.

PB 23854. RIKER, WALTER F., JUNIOR, AND WESCOE, CLARKE W. The direct action of prostigmine on skeletal muscle: its relationship to the choline esters. No date. 17 pp. Price: Microfilm, 50c.; Photostat, $2.00.

The work described in this paper was carried out under contract between the Chemical Warfare Service, United

[1] Supplied by the Information Service of the Council for Scientific and Industrial Research.

States Army and Cornell University Medical College. The work was performed by the Departments of Pharmacology and Medicine of Cornell University Medical College and the New York Hospital, New York City. The destruction of muscle cholinesterase was effected by the injection of an anti-esterase, di-isopropyl fluorophosphase (DFP), into the artery supplying the muscle. The characteristic contractile response of cat skeletal muscle to the intraarterial injection of acetylcholine was found to be essentially unaltered in the absence of esterase. The effect of DFP on the activity of skeletal muscle differs from that of prostigmine with respect to the time of onset and the contractile character of the response. The response of the muscle to prostigmine, as in the case of acetylcholine, is the same in the presence or absence of cholinesterase. It is concluded that the action of prostigmine is primarily a direct one and differs from that of a primary anti-esterase (DFP). The chemical and pharmacologic similarity of prostigmine, acetylcholine and carbaminylcholine is pointed out; it is suggested that prostigmine be classified pharmacologically with the choline esters. Bibliography, tables and neurograms.

PB 31269. BANNON, J. H., JUNIOR, *et alii*. Pharmacologic, toxicologic and physiologic observations on the effect of *p*-aminopropiophenone in man. Final report. May, 1946. 82 pp. Price: Microfilm, $2.00; Photostat, $6.00.

p-Aminopropiophenone by oral administration is an effective agent for the production of methæmoglobinæmia. Relatively constant low levels of methæmoglobin are obtained by the administration of the drug in tablet form after meals. Mild gastro-intestinal irritation results from the administration of this drug to some patients. This action seems to be unrelated to the level of methæmoglobinæmia. A progressive anæmia due to hæmolysis begins within the first few days after the beginning of the drug course, and it is accelerated with prolonged administration, reaching significant proportions of 40% to 50% usually within fifteen days. Anoxia due to anæmia and the presence of methæmoglobinæmia causes headache and depression of mental activity, but fails to cause cardio-respiratory disturbances at the levels of methæmoglobinæmia studied. Icterus, increase in serum bilirubin and urinary urobilinogen which may represent depression of liver function appear late in the drug course and cannot be attributed to the drug *per se* in the presence of severe anoxia. Return toward normal begins immediately after cessation of drug. *p*-Aminopropiophenone appears therefore to be a safe and reliable agent for the maintenance of low levels of methæmoglobinæmia for short periods. No change in the response to the drug was evident when a second course was given at three-week to four-week intervals. No idiosyncrasy was noted in the patients studied. A study of the effect on the blood serum bilirubin and urobilinogen excretion of prolonged PAPP-induced methæmoglobinæmia in six subjects over ten courses of eleven to thirty-one days is reported. A hæmolytic anæmia occurred with each course of drug. This is considered to be due to an effect on the circulating erythrocytes. There is no evidence of bone marrow irritation or depression of red cell formation. Recovery was prompt after discontinuance of PAPP. The hæmolytic nature of the anæmia is substantiated by the rise in serum bilirubin and increase in urobilinogen excretion. The mechanism of reticulocyte stimulation and the question of depressed liver function are discussed. PAPP is recommended as a means of producing prophylactic levels of methæmoglobinæmia in non-sensitive individuals for short periods. Observations on the cardiac output, ventilation and oxygen utilization are reported from ten experiments on six subjects at rest before and during PAPP-induced methæmoglobinæmia of 20% or less. No significant or consistent changes in circulation or respiration were noted with reduction of tissue PO_2 equivalent to that produced by 50% reduction in hæmoglobin concentration. Bibliography and tables pertinent to each section are included. This work was done by the New York University under contract with the chemical warfare service.

PB 31689. DUBOIS, KENNETH P., AND ERWAY, WILMA F. Studies on the mechanism of action of thiourea and related compounds. II. Inhibition of oxidative enzymes and oxidations catalyzed by copper. 1946. 23 pp. Price: Microfilm, $1.00; Photostat, $2.00.

This report describes tests of the rodenticide ANTU (α-naphthylthiourea) and other thiourea derivatives on rats *in vitro* and *in vivo*. (1) Phenylthiourea, α-naphthylthiourea, allylthiourea, thiourea and thiouracil inhibit tyrosinase. The most effective inhibitors are the most toxic to rats. The inhibition was not influenced by the particular substrate employed. The inhibition can be prevented by iodine or copper, but cannot be reversed by these substances. (2) ANTU and related compounds are effective inhibitors of the oxidation of ascorbic acid as catalyzed by inorganic copper. This inhibition can be prevented by increasing the copper concentration in the test system. (3) Phenylthiourea and ANTU do not inhibit the oxidation of cysteine as catalyzed by inorganic copper. (4) None of the thiourea derivatives studied inhibit the cytochrome oxidase or succinic dehydrogenase of lung or liver tissue of rats given lethal doses of the compounds. High concentrations of the compounds are necessary to inhibit these enzymes *in vitro*. Data and bibliography are included in the report. This report covers work under contract with the University of Chicago.

PB 31266. LANDAHL, H. D. The half-life of a drug in relation to its therapeutic index. No date. 7 pp. Price: *Microfilm, $1.00; Photostat, $1.00.*

The stability of a drug *in vivo* cannot always be measured by direct biochemical analysis. It is possible to determine the half-life with respect to the production of a particular measurable response (mortality, respiratory stimulation *et cetera*). In this report a procedure is given for the determination of the effective half-life *in vivo* with respect to an arbitrary response. Equations are also derived for a special case. A theoretical curve for response and for the relative therapeutic index are included.

PB 31006. HERRIOTT, ROGER M., *et alii*. Reaction of enzymes and proteins with mustard gas (bis (β-chlorethyl) sulphide). 1946. 70 pp. Price: Microfilm, $2.00; Photostat, $5.00.

This paper is based on work for the Office of Scientific Research and Development under Contract OEMsr-129 with the Rockefeller Institute for Medical Research and has appeared in progress reports from February, 1942, to April, 1944. This paper will also appear in the November, 1946, number of *Journal of General Physiology* and will be copyrighted by that journal. The report describes the reaction of proteins with mustard gas. The rate of reaction with thirteen proteins has been determined. The extreme variation in reaction rates is about 100:1. The carboxyl groups of all proteins reacted when the reaction with mustard was carried out at pH 6·0 in M/25 acetate buffer. The amino groups of proteins failed to react with the possible exception of yeast hexokinase. The colour obtained when proteins were mixed with Folin's phenol reagent at pH 8·0 decreased as the protein was treated with mustard. The colour returned on treatment of the mustard protein with alkali and many of the combined mustard groups were hydrolyzed. Graphs and bibliography are included.

PB 28568 MASSACHUSETTS INSTITUTE OF TECHNOLOGY. DEPARTMENT OF BIOLOGY. The X-ray diffraction patterns of kangaroo tendon. (Supplement to PB 22662; reported on page *276, v. 2, this bibliography.) No date. 3 pp. Price: Microfilm,* $1.00; Photostat, $1.00.

Treatment of tendon by dilute acids or alkalis, followed by neutralization, dialysis and drying, leads to no alteration of the low-angle X-ray pattern typical of normal collagen. Many of the reactions by which functional groups of the collagen may be altered take place in acid or alkaline media. Any changes in the pattern which are observed after alteration of the functional groups is, therefore, not attributable to the acid or alkali as such. Thus, though treatment with 0·01N HCl alone has no effect on the pattern, treatment with methyl alcohol in 0·01N HCl destroys the pattern. These investigative procedures apparently had as their aim the estimation of the average fibrillar radius in a collagen sample, the measurements of order intensity variation with tilt being pursued as a possible check on the intensity data to be used in plotting the electron density plots in collagen. This is a report on QMC project 50-D.

PB 31692. PAINE, TOM F. Illness in man following inhalation of *Serratia marcescens*. 1945. 17 pp. Price: Microfilm, $1.00; Photostat, $2.00.

Four individuals exposed to an aerosol of *Serratia marcescens* in high concentration developed acute illnesses in two and a half to four hours following exposure. The syndrome was characterized by ocular, respiratory and certain constitutional symptoms and signs which persisted from six to eleven hours. The laboratory data, graphs and bibliography are included. This report was written from the Station Hospital, Camp Detrick, Maryland.

PB 30015. BRANDLY, C. A., *et alii*. Newcastle disease and fowl plague investigations in the war research programme. No date. 6 pp. Price: Microfilm, $1.00; Photostat, $1.00.

The investigations upon Newcastle disease and fowl plague were directed chiefly toward the following: (1) perfection of diagnostic procedures especially to provide prompt recognition and differentiation; (2) development of effective methods and vaccines for active immunization; and (3) elucidation of epizoology as a basic control measure. A brief general presentation of the facilities and procedures employed is found in this report together with the more important results derived from the investigation. This work was performed by the Harvard Medical School between 1943 and November, 1945; this document is intended for publication in the *American Veterinary Journal*.

British Medical Association News.

THE General Secretary of the Federal Council of the British Medical Association in Australia has announced that the following medical practitioners have been released from full-time duty with His Majesty's Forces and have resumed civil practice as from the dates mentioned:

Dr. E. J. T. Giblin, Commercial Bank Chambers, Fitzroy Street, Tamworth, New South Wales (April, 1947).

Dr. C. J. Gibson, 21, Holden Street, Ashfield, New South Wales (December 7, 1946).

Dr. Janet M. C. Bowen, 14, Forrest Road, Double Bay, New South Wales (April 26, 1947).

Dr. N. F. Babbage, No. 2, Pembroke Street, Epping, New South Wales (April 1, 1947).

Dr. J. E. Carroll, 30, Railway Street, Chatswood, New South Wales (April 14, 1947).

Dr. W. Deane-Butcher, 135, Macquarie Street, Sydney (January 1, 1947).

Dr. T. E. H. Spark, 193, Macquarie Street, Sydney (April 1, 1946).

Medical Societies.

MELBOURNE PÆDIATRIC SOCIETY.

A MEETING of the Melbourne Pædiatric Society was held at the Children's Hospital, Carlton, on November 13, 1946, DR. A. P. DERHAM, the Chairman, in the chair.

Foreign Body in the Œsophagus.

DR. RAYMOND HENNESSY showed a male infant who had had a foreign body impacted in the œsophagus for four weeks, causing respiratory symptoms. The baby was born on April 20, 1946. He was admitted to hospital on July 13, 1946, at the age of twelve weeks. His local doctor in a letter stated that on June 26, 1946, when the baby was aged ten weeks, the elder child had placed a broad bean seed in the baby's mouth. The mother had been unable to recover it. Since then the baby had had an obstructive type of breathing, though he was taking his feedings well. Dr. Hennessy said that he saw the baby on the night of his admission to hospital and he observed a slight stridor with no other symptoms. The report of the X-ray examination which was made two days after admission was as follows: "No opaque foreign body shown, nor indirect evidence of non-opaque one. Appearances suggest enlargement of the right lobe of the thymus, and the trachea at about the level of the supra-sternal notch is narrowed even during inspiration." The breathing somewhat resembled a congenital laryngeal stridor and it was decided to observe the baby's progress. The baby was mainly dependent on breast feeding which was continued. After the baby had been in hospital five days the mother reported that the baby was not taking its feeds as well as hitherto and sometimes a little coughing and vomiting would occur during feedings. It was also observed that the child was losing weight.

Dr. Hennessy said that he decided that, if the child had a foreign body, it would be in the œsophagus and not in the air passages, and therefore he performed an œsophagoscopy on July 26, 1946, about thirteen days after the child's admission. He removed some parts of a disintegrated bean seed. The baby had some relief, but was obviously not right, so he repeated the œsophagoscopy three days later and removed the remainder of the bean seed. A part of the skin of the bean was passed *per rectum* the next day. No anæsthetic was used in these operations.

Dr. Hennessy said that the size of these bean seeds on the average was one inch in length and three-quarters of an inch in width, and it was amazing that an object so large could pass through the fauces of a baby of ten weeks without suffocating it. It was to be noted that the bean was in the œsophagus for 27 days. It was known that œsophageal foreign bodies in small infants under the age of twelve months caused very little disturbance of swallowing, but considerable disturbance of breathing. The stridor was caused by pressure through the œsophagotracheal wall resulting in a narrowing of the trachea. This was aggravated eventually by the œdema of the œsophageal mucosa which took place around the impacted foreign body. On account of the œsophageal obstruction, secretions of the mouth and pharynx were retained, overflowed into the larynx and caused coughing. During feedings it was inevitable that some of the food would overflow into the larynx also causing interruption of the feeding by coughing.

Dr. Hennessy said that he had had experience with two other babies under the age of twelve months with prolonged sojourn of foreign bodies in the œsophagus; in each case the foreign body was a coat button. In all these three cases the amount of dysphagia was very trivial compared with the size of the foreign body. In the case of the two older babies the dysphagia was apparent only when the child was given a biscuit or rusk.

Congenital Stenosis of the Œsophagus.

DR. JOHN COLEBATCH showed a male child, aged thirteen years and eleven months, who was suffering from dwarfism as the result of congenital stenosis of the œsophagus. He had been born one month prematurely and weighed five and a half pounds at birth. At the age of three weeks breast feeding had been discontinued because of failure to thrive, but when a diluted cow's milk feeding was substituted, the baby started vomiting and lost weight rapidly. A week later the mother had taken him to her local doctor who had wisely and successfully reestablished breast feeding, with good results. But when weaning was eventually carried out at nine months, the child's condition deteriorated and he developed the syndrome which he had presented ever since. Vomiting was the chief symptom. It occurred during or soon after a meal. Solid foods presented more difficulty than liquids, especially meat and bread which were usually regurgitated "as soon as they went down". The vomitus was never offensive or bile-stained. It usually consisted of undigested food, sometimes with brownish mucus, and occasionally it contained streaks of blood. As a rule the vomiting occurred several times a day, provided solid food was taken. But it was subject to variations, and once in early childhood it had almost ceased during the convalescent stage of bronchopneumonia—a feature referred to in several descriptions of this congenital abnormality. The child's appetite had always been reasonably good, yet his weight and height had never increased at a normal rate. He had been in no sense an invalid, and his mental progress had been very good, his scholastic attainments being normal for a boy of his age. There were no significant illnesses in the previous history nor in the family history. When nine months old he had spent three weeks in a hospital under observation as a "feeding problem". At the age of ten and a half years he had weighed only forty-one pounds. At that time the following investigations had been made, with normal findings: X-ray examination of the skull, of the wrists, and of the renal areas; Wassermann test of the blood; microscopy of the urine. He had been ordered an improved dietary and half a grain of *Thyreoideum Siccum* twice daily. On this treatment his condition improved and his annual gain in weight for the next three years averaged six and a half pounds.

On examination in the out-patient department in July, 1946, he was a pale stunted boy, who nevertheless appeared alert and intelligent. His weight, sixty-two pounds, was that of a boy of nine and a quarter years. His height, fifty-three and three-quarter inches, was that of a boy of ten and a half years. There was no evidence of mental retardation. The secondary sexual characteristics had developed normally. Dental caries was present. There was enlargement of the tonsils, of the lateral pharyngeal pads, and of the cervical glands. No abnormality was detected in any other system. The urine was microscopically clear and it contained no albumin or sugar. As was to be expected in a child partaking so sparingly of meat and other solid foods, examination of the blood showed anæmia with hypochromia of the red cells. The red cell count was 5,400,000 per cubic millimetre, the hæmoglobin value was 70% (10·1 grammes per 100 millilitres), the colour index was 0·65. X-ray examination after a barium bolus revealed a stricture extending apparently from the middle of the œsophagus to the cardiac orifice, with a considerable degree of dilatation of the proximal part of the œsophagus. A thin stream of barium passed slowly but continuously through the constricted segment, and the width of this stream varied slightly in serial films. A little peristalsis was evident in the lower portion of the œsophagus.

Clinically it had been thought that this was probably a case of diverticulum of the œsophagus, but the result of the X-ray examination had established the diagnosis of congenital stenosis of the œsophagus. After consultation in the out-patient department with Dr. A. Murray Clarke, the child had been referred to Dr. Raymond Hennessy, who had kindly agreed to continue the story.

Dr. Colebatch observed that this child presented a typical picture of congenital stenosis of the œsophagus. This con-

dition was found in the lower half of the œsophagus, and it was usually compatible with a fair state of general nutrition. The child demonstrated the dwarfism that might occur from malnutrition due to dysphagia and vomiting. He also exemplified two other features which Sheldon in the *Archives of Disease in Childhood* (1929) found to be a common occurrence in the male sex and in premature babies. Though congenital stenosis of the œsophagus was rare, the symptoms were not so uncommon, as they could be presented by a number of other œsophageal conditions, namely, cicatricial stenosis, œsophageal diverticulum, congenital short œsophagus ("thoracic stomach") and cardiospasm. To diagnose these conditions it was essential to make an X-ray examination after a barium bolus, and generally an œsophagoscopy was also required. Certainly it was advisable to make X-ray examination of any patient presenting the following triad of symptoms—failure to thrive, the vomiting of undigested food, dysphagia and vomiting that were worse with solid than with liquid foods.

In regard to treatment, Sheldon maintained that the passage of bougies was harmful and that some patients tended to recover in three or four years provided dietary measures alone were used. The majority of writers, however, were of the opinion that these patients showed little improvement whatever treatment was used. Dr. Colebatch wondered what the surgeons thought of a similar case reported in THE MEDICAL JOURNAL OF AUSTRALIA of May 18, 1946, by Dr. Richard Flynn, who had found on extrapleural exposure of the œsophagus that the obstruction to the swallowing of food appeared to be due to the presence of two aberrant azygos veins crossing in front of the œsophagus. Ligation and division of these veins had been followed within a few months by almost complete disappearance of the stenosis of the œsophagus.

DR. RUSSELL HOWARD said that he thought the case was a very interesting one. Treatment was operative and the attack should be a direct one. The results of dilatation were not good. The surgical approach was simple and similar to that for transthoracic gastrectomy. It was not a difficult operation. He was not certain of the mortality rate.

DR. RAYMOND HENNESSY said that when asked to see the patient by Dr. Colebatch he had had no hesitation in advising a gastrostomy, firstly because of the evident signs of malnutrition and secondly as a preliminary step in treatment which would be retrograde bouginage. This was in strong contrast to the very successful treatment by retrograde bouginage when the stricture was due to burns produced by such agents as caustic soda. Dr. Hennessy said that the reason for this was that the error in congenital stricture affected all three layers of the œsophagus, and it was, so to speak, a perfect error, whereas the damage done by caustics was due to splashing, and was necessarily patchy.

Dr. Hennessy said that he did not wish to go into tedious details about the method of treatment, but the main features were that the patient swallowed a silk thread which was recovered from the stomach, and Tucker's rubber bougies were pulled up through the gastrostomy wound, into the stomach, through the stricture and out through the pharynx. The treatment was carried out as a rule at intervals over a period of roughly two years. Dr. Hennessy said that he took a gloomy view of this boy's future and thought he would be obliged to have a permanent gastrostomy.

Dr. Colebatch, in reply, thanked Dr. Howard for his constructive remarks. It seemed from the natural history of the condition that constructive measures were worth a trial, but that in a boy of the patient's age they would not produce permanent relief. Dr. Colebatch said that he was grateful to Dr. Hennessy for allowing him to present the boy and to collaborate in the management.

Anomalies of Breast Development.

DR. H. BOYD GRAHAM showed a baby boy, L.G., just one year of age, who appeared to be perfectly normal and healthy; but it was demonstrated that on the left side there was not the slightest evidence of any breast or nipple, or any spot, dimple or scar to indicate the site of the missing breast. In order to discuss the subject of amastia or amazia, Dr. Graham showed a strip film, which had been prepared for him in the radiological department of the Children's Hospital, in which had been included photographs of the boy's chest, a brief summary of the embryology of the mammary glands, and a series of frames bearing on ætiological theories of amastia, its extreme rarity, cases reported in the medical literature to 1915 as summarized by Deaver and McFarland, additional cases tabulated after a search by Dr. Graham, and a consideration of reported associated defects.

The boy appeared to be unique in that, in the medical literature available in Australia, no other instance had been found of complete absence of the breast on one side in the male subject, especially without associated defects of chest wall structures or of homologous organs of generation or of any portion of the limbs. Excessive suppression of the primitive *Anlagen* of mammary tissue of the "milk line" at a very early stage rather than miscarriage of the developmental process at a later period or disturbance of the developing gene was postulated to explain the phenomenon.

An additional feature of interest in the case of L.G. was misplacement of the heart. Dr. Graham included in the strip film a reproduction of the skiagram of the chest showing how far over to the right side the cardiac silhouette was located and also an electrocardiogram obtained at the Alfred Hospital. Dr. Colin Macdonald had reported the presence of dextrocardia, though the œsophagus and stomach outlined with barium were demonstrably in the normal position. Dr. Macdonald commented that there were twelve ribs on each side, but that those on the left lay less horizontally than those on the right side. Dr. H. Lawrence Stokes in his report on the electrocardiographic tracings had noted the prominence of the *Q* waves in Lead I and again in Lead II, but the general appearance of the tracings was not indicative of dextrocardia.

By way of illustrating the opposite extreme, Dr. Graham included in his demonstration some photographs of a very small baby girl, G.L., two and a half years of age, with exuberant breasts carrying very dark brown areolæ. The child had been in his care recently because of vaginal hæmorrhage and under-nutrition. He also mentioned the hypoplastic state of the breasts and nipples normally found in prematurity as a clinical evidence of the late stage in embryology of the elevation of the epidermal pit brought about by proliferation of the underlying mesodermal tissues. A discussion of the subject of breast development and its anomalies was invited as well as consideration of reasons why L.G.'s heart was misplaced to the right.

DR. JOHN COLQUHOUN said that he had noticed a case of micromastia reported in the *British Medical Journal* of September 16, 1946. The patient was a woman who had borne two children, but was unable to suckle them. The breasts were small and possessed a nipple but no mammary tissue. Muscular deficiencies existed in the *pectoralis major* and *minor* and *serratus anterior* muscles. Winged scapulæ were also present. This case had been illustrated by photographs.

DR. H. LAWRENCE STOKES said that he had seen the baby a few weeks previously. He was interested in the association with dextrocardia. This case was not a true *"situs inversus"* and in this respect was unusual. Maude Abbott had recorded only two such cases in 1927. There was another type of dextrocardia in which the heart pivoted and rotated to the right so that the main mass of heart in contact with the chest wall was the left ventricle. In these cases there were usually other associated congenital cardiac lesions. There was no evidence of valvular disorder in Dr. Graham's case.

DR. KEITH HALLAM said that it would be interesting to have cheimographic studies to localize the various changes. Cheimography was a form or radiological delineation of the heart's borders by a series of wave effects. A special grid was divided into a series of panels for the purpose. The cardiac silhouette was photographed during the phases of the heart's cycles and was represented by a saw-tooth effect. Dr. Hallam also remarked that children with dextrocardia were particularly vulnerable to bronchiectasis at the base of the left lung. Dr. David Rosenthal had written extensively on this association in THE MEDICAL JOURNAL OF AUSTRALIA about ten years before. This patient should be investigated with this possibility in view.

DR. WILFRED FORSTER said that he was astonished that Dr. Graham did not include in his classification patients with multiple breasts. Dr. Forster said that he had seen patients with nipple-like structures in the axilla which secreted milk during lactation. Another woman had a kind of polycystic disease of the breast. Three separate cystic masses could be demonstrated in this case—at the umbilicus, at the xiphisternum and at the usual site of the breast.

Dr. Graham, in reply, said that he was grateful for the discussion which his case had provoked. In answer to Dr. Forster, he said that he was not ambitious to cover the whole field of breast anomalies, but merely to make some brief comments on relevant matter. Dr. Graham said that he thought that cheimographic studies on a "wriggling eel" of one year were hardly practicable, and would have to

be postponed. This also applied to electrocardiography to a large extent. No harm would arise from waiting. Dr. Graham assured the society that if anything of further interest should occur he would furnish a report at an opportune moment.

Albinism.

DR. ROBERT SOUTHBY presented a female child, aged four years and three months, with albinism. Her birth had been without untoward incident and she was the only child of healthy parents. There were no cases of albinism known on either side of the family. The progress of the child had been normal except for apparent blindness. She walked at fourteen months and talked with intelligence. She had been seen previously by two oculists who had given a hopeless prognosis regarding vision. She had been given a course of carotene tablets (two milligrammes containing 2,000 international units of vitamin *A*), one tablet daily for twelve months, during which time the parents considered that she had shown definite improvement. Examination revealed that the child was a typical albino with good general physical development, marked lateral nystagmus and some head nodding. She could see to a certain degree and played with other children. The carotene tablets were no longer available and she had been given "Prodoleum" (Nicholas) ten minims three times daily.

DR. NANCY LEWIS said that she was presenting three cases of albinism, not because of the rarity of the condition, the incidence being approximately 1 in 10,000, but because of the incidence of three children in one family and the difficulty of their management. Albinism was due to an inability to elaborate the intracellular oxidase ferment necessary for the formation of pigment. It also occurred in mammals and birds and could occur in plants as a result of self-fertilization. Albinism was inherited as a Mendelian recessive, but there was no history of albinism in the antecedents of this particular family. The children were aged eight, six and four years respectively. There were three other children in the family who were normally pigmented.

Dr. Lewis went on to say that the ocular defects associated with albinism were due to a lack of retinal pigment, and if the retinal pigment was normal, symptoms did not occur. These children all showed the typical changes of albinotic eyes. They had fair eyebrows and eyelashes, clear translucent irides in which the blood vessels could be seen and pink pupils due to reflection of light from the chorioidal vessels. On examination of their fundi the chorioidal and retinal vessels were seen to stand out against the sclera and the disks were determined only by the confluence of the retinal vessels. The children appeared to be photophobic, and all had nystagmus which was horizontal and rapid in type. The nystagmus was due to their defective vision which was present to a greater or less extent in all albinos. The defective vision was due to three causes: (i) lack of the retinal pigment with consequent disturbed function of the rods and cones; (ii) defective macula formation; (iii) excessive light entering the eye, producing a condition of glare, with consequent lack of contrast and, therefore, of definition of objects. Almost invariably albinism was associated with high refractive errors, myopia more commonly than hypermetropia; and astigmatism was common. The eyes of albinos were otherwise normal and were not specially prone to develop ocular disease. Nettleship, who had done much work on hereditary ocular defects, considered that the vision tended to improve with age.

The treatment of the condition was the correction of refractive errors by the use of shaded glasses with or without side pieces to reduce the glare. Other forms of treatment adopted were tattooing of the subconjunctival tissues and of the cornea, a clear central window being left, or the wearing of special contact lenses. The education of these children was a great problem. The eldest child had sufficient eyesight to be able to attend an ordinary school, but he failed to progress, although his intelligence quotient was 92. They lived at Warrnambool and at present all were being educated at the Blind Institute, although it was known that their vision was above that of Blind Institute standards. However, it did not seem to be a success in spite of the cooperation of the staff of the institute. The children were being taught to read and to write, but they were presenting behaviour problems. They found that they could tease the other children, who were unable to retaliate because of their very defective sight. Moreover they could be taught only up to grade II standards as the teachers of the higher grades were themselves blind and therefore taught only by Braille. The school for the partially sighted was under the direction of the Education Department, and this should be the ideal place for their education, but it was impossible for the children to attend this school because of the lack of any boarding facilities for the pupils. It would appear that the best treatment for them would be to return home, to attend an ordinary school, and to gain what learning they could, and later, for the two boys to take up farming with their father and for the girl to take up some occupation such as housework.

Fracture of Head of Radius.

DR. DOUGLAS STEPHENS, JUNIOR, presented a boy, aged thirteen years, who had fallen onto his right elbow on March 27, 1945, sustaining a fracture-dislocation of the head of the radius. At an operation on March 30, 1945, the head of the radius was excised. Convalescence was uneventful, and he had gradually regained some function in the elbow. However, examination at the present time, twenty months after the injury, revealed the following features of interest: 20° of limitation of extension, pronounced *cubitus valgus*, X-ray evidence of an oval bony body situated on the postero-lateral aspect of the joint limiting extension, a valgus condition of the wrist due to the relative overgrowth of the ulna, and a weak grip. It could be seen from this that the result was not all that could be desired. The following points would bear discussion and comment: (*a*) the advisability of early removal of the head of the radius as opposed to early replacement of the head; (*b*) the question of the time of election for an operation for transplantation of the ulnar nerve; (*c*) the necessity or otherwise for removal of the bony block to extension.

DR. RUSSELL HOWARD said that he had seen the boy in the out-patient department. He furnished a good example of what might happen after removal of the head of the radius. Gross *cubitus valgus* always occurred. The operation should be avoided if possible. The head could have been replaced in this case. If the head could not be replaced it would have been better to be conservative and to watch results. Concerning the *myositis ossificans*, Dr. Howard said that it might be limiting extension, but efforts to improve this by excision would not be successful.

DR. JOHN COLQUHOUN said that the late General Downes had endeavoured in cases of fracture of the head of the radius to reduce the fracture immediately, rather than to excise the head. Dr. Colquhoun said that he did not think gross *cubitus valgus* was an invariable sequel to the operation, although it had occurred in this case. He was not certain whether they were dealing with *myositis ossificans* or not. In spite of the marked *cubitus valgus*, the child had an elbow with quite good function. Trivial injuries around the elbow joint sometimes resulted in pronounced impairment of function, so that it was necessary to be guarded in prognosis. In this case there was no evidence of traction neuritis of the ulnar nerve. Therefore he would not advise transplantation at present; but if signs of neuritis appeared, the operation should be proceeded with.

DR. WILFRED FORSTER said that it was the usual teaching in Melbourne that the head of the radius should be removed in these cases. He had never seen good results follow. Twenty years before he was asked for advice about a young man who had sustained a fracture of the neck of the radius and whose mother had been told that operation for removal of the head was necessary. Dr. Forster said that he replaced the head at operation and obtained a good result. He was quite sure that it was wrong to remove the head. It could be put back quite early. They should be much more conservative in these cases.

DR. JOHN BEGG said that he had seen three patients in the out-patient department. The first was a girl past puberty whose epiphyseal centres were ossifying; excision of the radial head was followed by a good result. The second was a younger boy, and again the radial head was excised; but sight had been lost of him. The third child was younger still. Dr. Begg said that he thought at the time that it was unwise to remove the radial head from a child with growing epiphyses, but, at the operation, he had found it impossible to balance the fragment of bone. A bony peg seemed impracticable because of the size of the fragment; the radial head was holding only by periosteum, and it was inconceivable that aseptic necrosis would not occur; so reluctantly he excised the head. A week before the meeting he had seen the boy; he had a complete range of movement at the elbow joint and had a slight degree of *cubitus valgus* only. Therefore it was not correct to say that a good result never followed removal of the radial head. If it was possible to replace the head, it should be done. In this case it was impossible to keep the head in position.

Dr. Stephens, in reply, said that Watson-Jones favoured replacing the head in children. Dr. Stephens said that he had not performed the operation in this instance.

Post-Graduate Work.

THE POST-GRADUATE COMMITTEE IN MEDICINE IN THE UNIVERSITY OF SYDNEY.

Course in Advanced Medicine.

THE Post-Graduate Committee in Medicine in the University of Sydney announces that a course in advanced medicine suitable for candidates for the membership examination of the Royal Australasian College of Physicians will be conducted for a period of twelve weeks from June 9 to August 29, 1947; the fee for the course will be £31 10s. The programme has been arranged to take place mainly in the afternoons, from approximately 2 p.m. to 5 p.m. on five or six days per week, and will include the following: (i) four demonstrations in electrocardiography (normal cardiogram, coronary disease, the arrhythmias, deficiency diseases and infections); (ii) ward rounds at the principal metropolitan hospitals, to be held approximately twice per week, and to include demonstrations of cardio-vascular, nervous and chest diseases *et cetera*; (iii) library seminars at which recent literature on set subjects will be discussed; (iv) set lectures on the more obscure medical, biochemical, physiological and pathological problems; (v) demonstrations of the *fundus oculi*; (vi) demonstrations of pathology and hæmatology, to be held in the pathological departments of the metropolitan hospitals; (vii) discussions on applied physiology; (viii) demonstrations of the application of radiological methods of diagnosis to medical diseases; (ix) demonstrations of cases at Broughton Hall Psychiatric Clinic; (x) the exhibition of selected medical films, lantern slides, strip films *et cetera*; (xi) portions of the annual post-graduate course of interest to students in advanced medicine (lectures given by practitioners recently returned from overseas); (xii) library seminars in which students will participate.

It is expected that students will devote the whole of their time to study, and for this reason the mornings may be set aside for reading. Opportunity should be taken to peruse all the recent medical literature, and students will be guided in their reading by the supervisor of the course, Dr. W. P. MacCallum.

It is essential that candidates intending to take this course should make final arrangements with this committee at the earliest possible date. Those who are desirous of enrolling, but who cannot devote full time to study, should submit to the committee for consideration details of the time available to them.

Film Afternoon at Sydney.

The Post-Graduate Committee in Medicine in the University of Sydney announces that the following medical films will be shown at the Stawell Memorial Hall at the Royal Australasian College of Physicians, 145, Macquarie Street, Sydney, at 4.30 p.m. on Wednesday, May 21, 1947: (i) "Proctosigmoidectomy", (ii) "Carbon Dioxide Absorption Technique". All civilian medical practitioners and service medical officers are invited to attend. Further inquiries should be made by communicating with the Secretary of the Post-Graduate Committee in Medicine, 131, Macquarie Street, Sydney. Telephones: BW 7483, B 4606.

Correspondence.

THE TREATMENT OF ACUTE PERFORATION IN PEPTIC ULCER.

SIR: Dr. W. R. Lane misquotes my article when he states that "the percentage incidence of residual abscesses—subphrenic or pelvic—was greatly increased in the non-drained cases". Table VIII shows that 12 cases out of 165 developed subphrenic abscess, that is, a percentage of 7·27, compared with 17 cases out of 403 in the undrained cases, that is, a percentage of 4·21.

The incidence of pelvic abscesses—namely, 0·55%—in the 403 undrained cases is negligible and too small to draw any deductions therefrom.

The factors that Dr. Lane suggests should be considered to make the two series truly comparable are, in my opinion, irrelevant to the issue. The majority of people with peptic ulcers suffer from some degree of malnutrition and practically all are smokers, peptic ulcer being very rare in non-smokers. A review of the histories of the cases fails to show any evidence that pre-operative cardiac or pulmonary disease existed as a factor influencing complications or mortality.

A study of Tables III and IV will show that Dr. Lane has no grounds for the "reasonable assumption" that the 165 cases drained were the most ill, "either from generally poor condition, coexisting disease, or because bacterial peritonitis was far advanced". The facts are that 82 of the 165 drained cases—that is, 50%—had a duration of perforation from one to six hours, and 46, seven to twelve hours, that is, 28%. The cases drained were drained by surgeons who used a drain tube just because peritonitis was present and without any consideration of other factors such as age, duration, general condition *et cetera*.

Dr. Lane has failed to appreciate the main points in my paper, namely: (i) It is impossible to drain the peritoneal cavity. (ii) Attempts at drainage apart from causing other complications greatly increase the mortality in perforated peptic ulcer by adding further embarrassment to a shocked patient and seriously interfering with the protective function of the peritoneum in a grave emergency.

I cannot understand any surgeon not being convinced by Buchbinder and Droegemueller's experiments quoted in my article. They show that when drainage with a soft rubber tube was used in the treatment of perforative peritonitis in dogs, the mortality rose from 58% in the undrained to 100% in the drained.

It is not a question of whether the tube is hard or soft or how long it is left in; its mere presence is lethal.

Yours, etc.,

ALFRED J. TRINCA.

12, Collins Street,
Melbourne,
April 30, 1947.

Naval, Military and Air Force.

DECORATIONS.

THE undermentioned officers of the Australian Army Medical Corps have been mentioned in dispatches "for distinguished services whilst prisoners of war": Lieutenant-Colonel L. E. Le Souef, Major Brooke Moore, Captain Alan Joseph King, Captain David Norrie Fleming Leake, Captain Max Mayrhofer.

Australian Medical Board Proceedings.

TASMANIA.

THE undermentioned have been registered, pursuant to the provisions of the *Medical Act*, 1918, of Tasmania, as duly qualified medical practitioners:

Ramsay, Gregory John, M.B., B.S., 1936 (Univ. Sydney), Bellerive, Tasmania.

Vattuone, Angelo Bartolo, M.D., 1928 (Univ. Genoa), Rosebery, Tasmania.

Notice.

AUSTRALIAN AND NEW ZEALAND ASSOCIATION OF RADIOLOGISTS.

THE following is the programme for the annual general meeting of the Australian and New Zealand Association of Radiologists, to be held at British Medical Association House, 135, Macquarie Street, Sydney.

Friday, May 16.—10 a.m.: Annual general meeting. 2 p.m.: Meeting of Council; demonstration at British Medical Association House. 8.15 p.m.: "Some Lesions of the Intervertebral Disk", by Dr. James H. Young (Western Australia), in collaboration with the late Dr. D. I. Smith; "Therapeutic Possibilities of Radiophosphorus and other New Radioactive Materials", by Dr. A. G. S. Cooper (Queensland),

Saturday, May 17.—9.30 a.m.: "Modern Advances in Physics of Radiology", by Dr. C. E. Eddy (Victoria); "Some Considerations on the X-Ray Treatment of the Cervical Spine", by Dr. J. O. O'Sullivan (Victoria); "X-Ray Survey of Chests of the University Students", by Dr. Keith Hallam (Victoria). 7 p.m.: Dinner at the Hotel Australia.

If the Council meeting is not completed on the afternoon of Friday, May 16, it will be adjourned till 2.15 p.m. on the afternoon of Saturday, May 17, which is otherwise free. Inquiries should be made from Dr. Alan R. Colwell (acting for the Executive Committee) at the Royal Prince Alfred Hospital, Camperdown, New South Wales. Medical practitioners interested are invited to attend the clinical lectures.

THE CENTENARY OF ANÆSTHESIA IN AUSTRALIA.

THE commemoration of the centenary of the giving of the first anæsthetic in Australia by Dr. Pugh will take place in Launceston on Saturday and Sunday, June 7 and 8, 1947. The first meeting will be semi-public, and will be held at 8 p.m. on Saturday, June 7. The following lectures will be delivered: (i) "The Introduction of Surgical Anæsthesia in Van Diemen's Land", by W. E. L. H. Crowther; (ii) "A Curious Incident in the Life of Pugh", by C. Craig. The dress for this meeting will be evening and academic. At 11 a.m. on Sunday, June 8, Dr. Geoffrey Kaye will deliver a lecture on "Modern Methods of Anæsthesia".

Obituary.

WALTER WALLACE MARTIN.

WE regret to announce the death of Dr. Walter Wallace Martin, which occurred on March 2, 1947, at Moss Vale, New South Wales.

Nominations and Elections.

THE undermentioned have applied for election as members of the New South Wales Branch of the British Medical Association:

Percy, Neville, M.B., B.S., 1946 (Univ. Sydney), Sydney Hospital, Macquarie Street, Sydney.

Freeman, Jessie Strahorn, M.B., B.S., 1946 (Univ. Sydney), 6, Challis Avenue, Potts Point.

The undermentioned has applied for election as a member of the Victorian Branch of the British Medical Association:

Rechelmann, Georg, M.D. (Univ. Freiburg), Walwa, via Wodonga, Victoria.

The undermentioned has applied for election as a member of the Tasmanian Branch of the British Medical Association:

Gibson, Heath Byres, M.B., B.S., 1942 (Univ. Melbourne), Lindisfarne, Tasmania.

Medical Appointments.

Dr. A. N. Kingsbury has been appointed a member of the Food Standards Advisory Committee of Western Australia, under the provisions of *The Health Act*, 1911-1944.

Dr. W. S. Cook has been appointed a member of the Visiting and Advisory Committee of the Fremantle Hospital, Western Australia.

Dr. H. E. Pellew has been appointed medical officer to the Night Clinic (Female Section), Royal Adelaide Hospital, Adelaide.

Dr. A. D. D. Pye has been appointed deputy chairman of the Council of the Queensland Institute of Medical Research, in pursuance of the provisions of *The Queensland Institute of Medical Research Act of* 1945.

Books Received.

"Ben Hall: The Bushranger", by Frank Clune; 1947. Sydney, London: Angus and Robertson, Limited. 8¼" × 5¼", pp. 250. Price: 10s. 6d.

"Clinical Practice in Infectious Diseases: For Students, Practitioners and Medical Officers", by E. H. R. Harries, M.D. (London), F.R.C.P., and M. Mitman, M.D. (London), F.R.C.P., with a foreword by Sir Allen Daley, M.D. (London), F.R.C.P.; Third Edition; 1947. Edinburgh: E. and S. Livingstone, Limited. 8¼" × 5¼", pp. 690, with illustrations. Price: 22s. 6d.

"Radiology for Medical Students", by Fred Jenner Hodges, M.D., Isadore Lampe, M.D., and John Floyd Holt, M.D.; 1947. Chicago: The Year Book Publishers Incorporated. 8" × 5¼", pp. 424, with many illustrations. Price: $6.75.

"Materia Medica for Nurses: A Textbook of Drugs and Therapeutics", by W. Gordon Sears, M.D. (London), M.R.C.P. (London); Second Edition; 1947. London: Edward Arnold and Company. 7¾" × 5", pp. 254. Price: 5s.

Diary for the Month.

MAY 13.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
MAY 13.—Tasmanian Branch, B.M.A.: Ordinary Meeting.
MAY 19.—Victorian Branch, B.M.A.: Finance Meeting.
MAY 20.—New South Wales Branch, B.M.A.: Medical Politics Committee.
MAY 21.—Western Australian Branch, B.M.A.: General Meeting.
MAY 22.—New South Wales Branch, B.M.A.: Clinical Meeting.
MAY 22.—Victorian Branch, B.M.A.: Executive Meeting.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

New South Wales Branch (Honorary Secretary, 135, Macquarie Street, Sydney): Australian Natives' Association; Ashfield and District United Friendly Societies' Dispensary; Balmain United Friendly Societies' Dispensary; Leichhardt and Petersham United Friendly Societies' Dispensary; Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney; North Sydney Friendly Societies' Dispensary Limited; People's Prudential Assurance Company Limited; Phœnix Mutual Provident Society.

Victorian Branch (Honorary Secretary, Medical Society Hall, East Melbourne): Associated Medical Services Limited; all Institutes or Medical Dispensaries; Australian Prudential Association, Proprietary, Limited; Federated Mutual Medical Benefit Society; Mutual National Provident Club; National Provident Association; Hospital or other appointments outside Victoria.

Queensland Branch (Honorary Secretary, B.M.A. House, 225, Wickham Terrace, Brisbane, B.17): Brisbane Associated Friendly Societies' Medical Institute; Bundaberg Medical Institute; Brisbane City Council (Medical Officer of Health). Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL or position outside Australia are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.

South Australian Branch (Honorary Secretary, 178, North Terrace, Adelaide): All Lodge appointments in South Australia; all Contract Practice appointments in South Australia.

Western Australian Branch (Honorary Secretary, 205, Saint George's Terrace, Perth): Wiluna Hospital; all Contract Practice appointments in Western Australia. All government appointments with the exception of those of the Department of Public Health.

Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

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